Participant Handbook

CHCEDS413A Support Students with Learning Difficulties and Learning Disabilities

Developed as a unit of training for
Disability Support Staff within Tertiary Education

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Section One

Introduction

CHCEDS413A Support students with learning difficulties and learning disabilities.

Unit Descriptor	This unit specifies the foundation competencies required for disability support staff in an adult learning environment to provide appropriate interventions and support for students who identify as having learning difficulties or learning disabilities.

Application	The learning resource for this unit has been developed for education support work in a variety of 'Adult Education' contexts. Disability Support Workers generally work with guidance and direction from the Disability Coordinator / Disability Liaison Officer or their equivalent. Disability support workers apply knowledge of appropriate educational responses as part of a team supporting students with learning difficulties and learning disabilities.

Expectations of Learners	This learning resource has been mapped to a level 4 competency standard from the CHC08 Community Services Training Package. At this level you are expected to: • Demonstrate a broad knowledge base incorporating some theoretical concepts • Apply solutions to a defined range of unpredictable problems • Identify and apply skill and knowledge to a wide variety of contexts • Identify, analyse and evaluate your own outputs in relation to quality standards • Take responsibility for your own outputs • Take limited responsibility for the quality and quantity of the output of others.

Employability Skills	Employability Skills are embedded and explicit within this unit of competency. Employability Skills are integral to workplace competency and are reflected within the design, customisation, delivery and assessment of this learning unit in an integrated and holistic way.

EMPLOYABILITY SKILLS	FACETS ADDRESSED: Industry/enterprise requirements for this qualification include the following facets:
Communication	1. Listening to and understanding *work instructions, directions and feedback* 2. Speaking clearly/directly to *relay information* 3. Reading and interpreting workplace related documentation, *such as safety requirements and work instructions* 4. Writing to address audience needs, *such as work notes and reports* 5. Interpreting the needs of internal/ external clients *from clear information* 6. Applying numeracy skills to workplace requirements *involving measuring and counting* 7. Establishing and using networks 8. Sharing information *(eg. with other staff and clients)* 9. Negotiating responsively *(eg. re own work role and/or conditions, possibly with clients)* 10. Persuading effectively *(ie. within scope of own work role)* 11. Being appropriately assertive *(eg. in relation to safe or ethical work practices and own work role)* 12. Empathising *(eg. in relation to others)*
Teamwork	1. Working as an individual and a team member 2. Working with diverse individuals and groups 3. Applying knowledge of own role as part of a team 4. Applying teamwork skills to a range of situations 5. Identifying and utilising the strengths of other team members *(and providing encouragements and support to colleagues)* 6. Giving feedback, coaching and mentoring
Problem solving	1. Developing practical and creative solutions to workplace problems *(ie. within scope of own role)* 2. Showing independence and initiative in identifying problems *(ie. within scope of own role)* 3. Solving problems individually or in teams *(ie. within scope of own role)* 4. Applying a range of strategies in problem solving 5. Using numeracy skills to solve problems *(eg. time management, simple calculations, shift handover)* 6. Testing assumptions and taking context into account *(ie. with an awareness of assumptions made and work context)* 7. Listening to and resolving concerns in relation to workplace issues 8. Resolving client concerns relative to workplace responsibilities *(ie. if role has direct client contact)*
Initiative and enterprise	1. Adapting to new situations *(ie. within scope of own role)* 2. Being creative in response to workplace challenges *(ie. within relevant guidelines and protocols)* 3. Identifying opportunities that might not be obvious to others *(ie. within a team or supervised work context, including identification of skill gaps)* 4. Generating a range of options in response to workplace matters 5. Translating ideas into action *(ie. within own work role)* 6. Developing innovative solutions *(ie. within a team or supervised work context and within established guidelines)*

Planning and organising	1. Collecting, analysing and organising information *(ie. within scope of own role)* 2. Using organisation systems for planning and organising *(ie. if applicable to own role)* 3. Being appropriately resourceful *(ie. within scope of own role)* 4. Taking initiative and making decisions within workplace role *(ie. within authorised limits)* 5. Participating in continuous improvement and planning processes *(ie. within scope of own role)* 6. Working within clear work goals and deliverables 7. Determining or applying required resources *(ie. within scope of own role)* 8. Allocating people and other resources to tasks and workplace requirements *(ie. within scope of own role)* 9. Managing time and priorities *(ie. in relation to tasks required for own role)* 10. Adapting resource allocations to cope with contingencies *(ie. if relevant to own role)*
Self-management	1. Being self-motivated *(ie. in relation to requirements of own work role)* 2. Articulating own ideas *(ie. within a team or supervised work context)* 3. Balancing own ideas and values with workplace values and requirements 4. Monitoring and evaluating own performance *(ie. within a team or supervised work context)* 5. Taking responsibility at the appropriate level
Learning	1. Being open to learning new ideas and techniques 2. Learning in a range of settings including informal learning 3. Participating in ongoing learning 4. Learning in order to accommodate change 5. Learning new skills and techniques 6. Taking responsibility for own learning *(ie. within scope of own work role)* 7. Contributing to the learning of others *(eg. by sharing information)* 8. Applying a range of learning approaches *(ie. as provided)* 9. Participating in developing own learning plans *(eg. as part of professional development)*
Technology	1. Using technology and related workplace equipment *(ie. if within scope of own role)* 2. Using basic technology skills to organise data 3. Adapting to new technology skill requirements *(ie. within scope of own role)* 4. Applying OHS knowledge when using technology 5. Applying technology as a management tool

Essential Knowledge

The participant must be able to demonstrate essential knowledge required to effectively perform task skills, task management skills, contingency management skills and job/role environment skills as outlined in elements and performance criteria of this unit,

These include knowledge of:

- Diversity
- Roles and responsibilities of the teacher/s and the education support worker
- Effects of learning difficulties and learning disabilities
- Relevant legislation, policies and standards that regulate education service delivery, occupational health and safety, behaviour support and anti-discrimination
- Language, literacy and numeracy support strategies appropriate to the phase of learning
- Support appropriate to a range of learning situations for students with learning difficulties or learning disabilities

Essential Skills

It is essential that the participant demonstrate the ability to:

- Contribute to the education team and participants in planning for students with learning difficulties and/or disabilities

In addition, the candidate must be able to demonstrate relevant task skills; task management skills; contingency management skills and job/role environment skills.

These include the ability to:

- Communicate using a range of verbal and non–verbal, written and technological techniques
- Use inclusive language
- Maintain confidentiality
- Work as part of a team
- Practice self-management
- Use problem solving strategies
- Set up and use adaptive technologies required by students
- Adapt education resources to meet the needs of students with learning difficulties

Elements	Performance Criteria
1. Identify problems experienced by students with learning difficulties or learning disabilities.	1.1 Explain the difference between learning difficulties and learning disabilities. 1.2 Identify learning difficulties associated with literacy. 1.3 Identify learning difficulties associated with numeracy. 1.4 Identify learning difficulties associated with learning how to learn. 1.5 Identify learning difficulties associated with attention deficit hyperactivity disorder. 1.6 Identify learning difficulties associated with conditions affecting processing visual information.
2. Contribute to team planning for students learning difficulties in a supportive education environment.	2.1 Provide observations to the education team to inform the process for planning for students with learning difficulties. 2.2 Develop expectations for students with the education team. 2.3 Plan strategies to increase student access to learning with the education team. 2.4 Identify and assemble required resources.
3. Provide support to students With learning difficulties	3.1 Use assistive technologies where appropriate. 3.2 Use planned strategies to meet the needs of individual students. 3.3 Provide students with regular opportunities for practicing new skills 3.4 Monitor student progress and inform teachers on a regular basis.

Specific disability support roles referred to in this training include;

- Participation Assistant
- Note taker
- Adaptive Technology support
- Alternate format support
- Library / Research Assistant
- Tutor
- Alternate examination arrangements

CHCEDS413A Support students with learning difficulties and learning disabilities.

Assessment

This unit is designed for people who provide or have a career goal of providing participation assistance/ disability support for adult learners with learning disabilities or learning difficulties, who are studying in an adult learning environment such as TAFE, the workplace, university and other community based adult learning settings.

Participants will learn the skills required to provide assistance and support to students and teachers and to facilitate independent student learning under broad based supervision. To demonstrate competency in this unit, you must be able to provide evidence that you meet the requirements of the elements and performance criteria as outlined on pages 9 & 10. This includes evidence that you have integrated this knowledge into aspects of your work in an adult learning environment such as a TAFE, university or community education provider.

There are **three** components to the assessment for this course, for face to face delivery these are;

1. Participation in a full day lecture style seminar. This will include information sharing, workshops and group discussions.
2. Participation in a group work presentation (component of the assessment task / or completion of assessment tasks through online learning format).
3. Completion of / and satisfactory assessment against the activities set out within this workbook. The activities are identified by the pen icon

With online participation there are three areas of assessment, these include:

1. Completion of / and satisfactory assessment against the activities set out within the online learning unit including one 500 word essay.
2. Demonstrated understanding of the learning material reflected through online posts in response to targeted questions and discussions within the online unit.
3. Evidence of further research and application of learning reflected through online posts and discussions.

This learning material is also designed to be used as professional development for new Disability Support Staff who do not wish to obtain accreditation. For example if the staff person already has a higher level disability specific qualification. In this instance the assessment tasks do not have to be completed.

Resources to support this training

- the participant's workbook (this resource)
- the *Grasp the Nettle* cd – Transition experiences from tertiary students with learning disabilities that is located at: http://www.ndcovictoria.net.au/Information---Resources/Tertiary-Transition-CDs.aspx.
- the suite of portable assistive technology applications designed to improve participation in education for students with disabilities; located at: http://www.rsc-ne-scotland.ac.uk/.
- the EduApps User Manual developed by Gerry Kennedy on behalf of the National Disability Coordination Officer program incorporating Access Apps that is located at

- http://ndco.wodongatafe.edu.au/Data/Sites/1/eduappsusermanual.pdf
- a range of websites included in the reference list for participants to source further information, including;

  http://www.eduapps.org/
  http://www.adcet.edu.au/Cats/Specific_Impairments/Learning_Disabilities.chpx
  http://www.services.unimelb.edu.au/edp/policy/success/learningdisability.html
  http://www.ldonline.org/
  http://www.ldresources.com/
  http://www.ldnetwork.com

Facilitating the program

This participant resource has been designed to support the delivery of the CHCEDS413A *Support Students with Learning Difficulties and Learning Disabilities* unit from the Community Services Training Package. It is also designed as professional development for presentation by facilitators who have a working knowledge of, and background experience working with people who have a learning disability or learning difficulty in an adult learning environment. This may include Disability Liaison Officers (DLOs), Equity Officers, Specific Student Service staff and teachers who demonstrate an appropriate approach to providing 'reasonable adjustments' and facilitating an inclusive learning environment for students with a disability.

Objectives

1. To develop the knowledge and skills required to work effectively as a disability support worker with adult learners who experience learning disabilities or learning difficulties within an adult learning environment.
2. To ensure that Disability Support Workers understand the legislative, moral and philosophical approaches within education that encourages independence, life skills and empowerment for students with a learning difficulty or learning disability.

Why are we doing it?

The approaches and attitudes of Disability Support Staff within an adult learning environment are central to the personal learning experiences and course outcomes for students with a disability. Effective and appropriate support processes that respect the individual and promote independent learning, while also facilitating access to information and full participation are recognized broadly as the most empowering approaches for students with a disability.

This training will:

- prepare Disability Support Staff to work more effectively with students with learning difficulties or learning disabilities across diverse learning environments.
- provide students with learning disability and learning difficulties with higher quality support services from within the learning environment.
- ensure the education organization meets its obligations arising out of legislative standards.

Section Two

Understanding Learning Difficulties and Learning Disabilities

History of Learning Disabilities

The prevalence of learning disabilities was under study as far back as the 1800s where it was already noted that persons with no apparent aetiology such as stroke, intellectual disability or other form of brain damage were experiencing difficulty in learning to read despite conventional instruction, adequate intelligence, and socio-cultural opportunity. Learning Disability was first termed 'word blindness' by Adolph Kussmaul. Kussmaul and an ortholomogist Hinshelwood were very interested in understanding what was happening for people who appeared to have complete and intact power of sight, intellect and speech but who could not read the written word. Hinshelwood introduced the term 'dyslexia' and defined it to mean delays in learning to read that are hereditary.

Learning disabilities were predominantly studied in the domains of neurology, medicine and ophthalmology until the origins of mass reading came about with the introduction of compulsory schooling around 1918. With compulsory education, psychologists, educators and sociologists became interested in the phenomenon of learning disabilities. The most influential contributor to the emerging understanding of learning disability or 'dyslexia' as it was more commonly referred to in this period of time, was the neuropathologist Samuel Orten. Orten added significantly to the growing knowledge of learning disabilities and in 1937 made claims that more than ten percent of the school population exhibited reading disabilities. This claim is still believed to be accurate, with most countries identifying that approximately 10% of the population has extreme difficulties learning to read and write.

Australia did not explore the concept of learning disabilities in any significant way until the 1950s when Professor Fred Schonell of the Queensland University established a 'Remedial Education Centre' in Brisbane. The Remedial Education Centre modelled practices Schonell had researched through time he had spent in the UK. Schonell also developed and delivered the first formally recognised Australian Certificate in Diagnostic Testing and Remedial Teaching through the Queensland University and published the first Australian Journal on Learning Disabilities.

Indicative of the approach and beliefs of the time where specific learning disabilities such as dyslexia were not defined from other causes of learning difficulty the journal was titled 'The Slow Learning Child', and was subtitled 'The Australian Journal on the Education of Backward Children'.

For the last time, our son is not backwards. He's just dyslexic.
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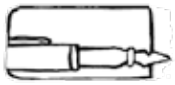
Since the 1950s there has been a great deal of research applied to the subject of Specific Learning Disability (SLD). Dyslexia is the most common term used for SLD as 85% of people diagnosed with learning disabilities have as their primary academic problem - reading, writing and spelling. The history of learning disability has been embedded strongly in the medical, neurological and psychological domains as such it has been viewed primarily from a medical deficit approach. This is beginning to change with new understandings, emerging technologies and people with learning disabilities speaking out about good practice approaches to creating access to information that results in improved participation in education and employment.



Give a brief overview of your own understanding of specific learning disability such as dyslexia. What characteristics do you associate with people with learning disabilities? / What are their core difficulties? / Think of someone you know with a learning disability - what are their strengths and weaknesses?

Defining Specific Learning Disabilities

An accepted definition of Specific Learning Disability that is used internationally is:

*The term **learning disabilities** refers to a variety of disorders that affect the acquisition, retention, understanding, organisation or use of verbal and/or non-verbal information. These disorders result from impairments in one or more psychological processes related to learning, in combination with at least average abilities essential for thinking and reasoning. Learning disabilities are specific not global impairments and as such are distinct from intellectual disabilities (Australian Learning Disabilities Association).*

Learning disabilities range in severity and invariably interfere with the acquisition and use of one or more of the following important skills:

- oral language (e.g. listening, speaking, understanding)
- reading (e.g. decoding, comprehension)
- written language (e.g. spelling, written expression)
- mathematics (e.g. computation, problem solving)

People with learning disabilities may also have difficulties with organisational skills, short term memory, social perception and social interaction. The impairments are generally life-long. However, their effects may be expressed differently over time depending on the match between the demands of the environment and the individual's characteristics. Some impairment's may be noted during the pre-school years while others may not become evident until much later. During the school years, learning disabilities are suggested by unexpectedly low academic achievement or achievement that is sustainable only by extremely high levels of effort and support.

Learning disabilities are due to genetic or other congenital and/or acquired neuro-biological factors. They are not caused by factors such as cultural or language differences, inadequate or inappropriate instruction or socio-economic status or lack of motivation, although these and other factors may compound the impact of learning disabilities. Learning disabilities are not related to intelligence and can occur in severe, moderate or mild forms. People with learning disabilities have their own individual profiles of strengths and weaknesses; no two people are exactly the same and the impact on each individual is different.

Learning disability is to all intents and purposes a 'hidden' disability. Often the first indication is a discrepancy between the knowledge or ability a student demonstrates in class or in discussion and results on written assignments or in examinations.

Broadly speaking, the contemporary understandings of specific learning disability are;

- that discrepancy occurs because people with specific learning disabilities experience difficulties with one or more of the psychological processes involved in understanding or using spoken or written language
- this is manifested in difficulty in one or more areas of listening, thinking, speaking, reading, writing, spelling, or doing simple mathematical calculations
- these difficulties are understood within the literature as poorly specified phonological representation
- multimodal neuroimaging studies also reveal that that significant differences exist between the development and functioning of the brains of people with dyslexia and people without dyslexia
- specific learning disabilities are now broadly accepted as congenital disorders that are hereditary and traceable through families
- specific learning disabilities are understood as a chronic condition, impacting across the life-span on self-esteem, education, vocation and socialisation.
- specific learning disabilities "occur independently of general intellectual ability and in spite of exposure to best practice teaching".
- specific learning disability is generally recognised when an individual ranks higher than 80 on an IQ score and presents with unexplained discrepancies in language and literacy or numeracy tasks.
- dyslexia is the term used broadly to refer to the subset of specific learning disabilities that involves language.
- The fact that the brains of children and adults with dyslexia work differently endows some, if not many of them, with other ways of perceiving, understanding, and thinking. When referring to people with dyslexia, many use the expression 'thinking outside the box'. This will often be reflected in creative, unconventional, and sometimes superior abilities.

How do Learning Disabilities differ to Learning Difficulties

When describing learning problems in Australia, two frameworks are most commonly used by the education, community and government sectors. These are the learning difficulties framework, and the learning disability framework. For the purposes of this training the Learning Disability Framework is the approach adopted. There are a number of reasons for this, of primary importance is recognition of the specifics of learning disability, for example; it is often congenital, it is a lifelong condition, it is not remediated through intense education and it is not a consequence of low intelligence. The grouping of people with specific learning disability such as dyslexia within the learning difficulty framework denies recognition of the underlying causes of specific learning disability, denies access to information about how to accommodate the learning disability and assumes that people can 'learn' through intense teaching models.

Under the learning difficulty framework it is assumed that individuals with specific learning disability will respond to teaching approaches and improve academically. The failure to respond to intensive teaching by students with learning disabilities often results in students being labelled as lazy, dumb, unmotivated etc. The impact from repeated experiences of failure and the shame associated with repeated failure is evidenced in the literature through biographical statements from individuals with learning disabilities who share their stories.

Below is a summary of the main features of these two frameworks, and the differences between them.

Learning difficulty framework	Learning disability framework
Learning difficulty is a non-categorical definition, including all those who have difficulties learning one or more of the basic academic skills. The National Health & Medical Research Council estimates 10 -16% of population have learning difficulties. Note: This framework includes those who would be classified as having a learning disability under the learning disability framework; such people are often referred to as having specific or severe learning difficulties.	Learning disability is a categorical definition based on diagnosis. The National Health and Medical Research Council estimates 2-4% of the population have learning disabilities. NB: (the estimated 2.4% is controversial and research has evidenced learning disability to be closer to 10% internationally).
Does not recognise the term 'learning disability' as distinct from the term 'learning difficulty'.	Makes a distinction between 'learning difficulties' and 'learning disabilities'. Learning difficulties readily respond to intensive educational intervention. Learning disabilities are lifelong and pervasive, and do not respond readily to intensive education intervention.
Does not focus on the primary cause of the learning difficulty. The focus is on the functional educational difficulties rather than on specific causes, except where the cause may influence the type of educational intervention applied.	Views learning disabilities as being of neurological origin. Views learning difficulties as resulting from specific causes, such as physical, educational, emotional, or environmental factors.
Learning difficulties are viewed as responsive to intensive educational intervention.	Learning disabilities are viewed as lifelong conditions which are highly resistant to educational interventions. Even with intensive, proven educational interventions, skills do not improve quickly or significantly.
Effective educational intervention will improve basic academic skills such as reading and writing, and will result in an improvement in the individual's academic achievement levels.	Intensive educational intervention alone will assist individuals with learning difficulties, but will provide minimal results for individuals with learning disabilities. Academic adjustments and accommodations, and individualised learning strategies are necessary to enable individuals with learning disabilities to achieve at their ability level.
The term 'learning difficulty' is used by some services, support groups and peak bodies, as well as in most areas of primary and secondary education.	The term 'learning disability' is used by universities, TAFEs, most educational and clinical psychologists, speech pathologists and in some areas of school education.
Learning difficulties are not recognised as disabilities under the Disability Discrimination Act and under state disability legislation. Learning difficulties arising from physical, emotional or environmental causes are not covered by the legislation because they are not assumed to be underlying disorders or malfunctions (Puplick, 1995).	Learning disabilities are legally recognised as disabilities. The rights of individuals with learning disabilities are covered by the federal Disability Discrimination Act and by state disability legislation.

Understanding the difference between learning difficulties and learning disabilities is essential for appropriate classification or diagnosis for individuals. Inappropriate classification i.e. deciding a person has a learning difficulty that can be remedied through targeted tuition can result in continued failure if that student has a non-diagnosed specific learning disability such as dyslexia. In contrast, not providing targeted tuition to a student with a learning difficulty who will benefit from additional and targeted teaching approaches will also foster ongoing failure.

First, is to understand that there is a distinct difference between learning disability and learning difficulty even though the two terms are sometimes used interchangeably. **Learning difficulties** is a general term which refers to children or students who experience difficulties with their learning.

Research suggests that between 10-16% of children and students exhibit difficulties in academic and developmental skills (Louden eta al 2000). A learning difficulty can result from a variety of reasons including one or more of the following:

- developmental delay, for example speech and language difficulties
- poor coordination, for example fine and gross motor skills
- emotional difficulties and/or trauma
- limited environmental experiences
- lack of appropriate educational opportunities
- interrupted schooling
- health issues

A **learning disability** on the other hand stems from a discrepancy in the central nervous system where a disorder is manifested by significant difficulties in acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. Learning disabilities is a term used for learners with average or above average intelligence who exhibit developmental and academic skills that are *significantly* below expectation for their age and general ability.

It is also important to understand that learning disability is in no way associated with Intelligence Quotient (IQ). People who have low intelligence quotient of approximately 70 or lower will have reduced ability to learn, communicate, self-help, play or work. Degrees of lower level intelligence vary and can range from mild to moderate to profound. In contrast, people with a specific learning disability generally have average to higher than average intelligence and the learning disabilities show up in different ways in different individuals. They can have problems with visual perception (understanding or remembering what they see), which can make activities like reading letters or copying shapes very difficult. Or they can have problems with auditory perception (understanding or remembering what they hear) or using language to tell or write a story. A learning disability can cause difficulties in math, reading, writing, or spelling. Some people with a learning disability have organizational problems that can affect school or work. While people with learning disabilities have average or above-average intelligence their learning disability however, creates a gap between ability and performance. They tend not to do well in environments that aren't suited to their learning style, but do learn very well when taught appropriately.

A key determinant in differentiating learning disabilities from those with an IQ below 70 is through a discrepancy in ability. Those with an IQ at 70 or below are identified as having an Intellectual Disability and have global dysfunction across all areas of ability.
Those with a learning disability will have specific and not global areas of difficulty. This is why it is important to be able to discern from learning difficulty to learning disability – until we understand what a person's difficulties are and how they learn best it is very difficult to accommodate their learning needs.

In Australia the practice has been to 'lump' all students with apparent learning difficulties together. As a result students with non-diagnosed learning disabilities have continued to fail and prematurely leave formal education.

These same students may return to education as adults but will not have a clear understanding about why they had learning difficulties in prior education, in this situation there is a strong likelihood that the cycle of failure in education will be perpetuated.

The lasting impact of continued failure cannot be underestimated. The literature reflects the consequences of not identifying and providing adequate educational assistance to children with specific learning disability at an early age, with those that do not survive, heavily reflected in the demographics of the nation's suicide statistics, criminal justice system, mental health numbers, the unemployed, the tentatively employed and those in low skill high risk employment situations.

How do we classify / diagnose Learning Disability

Classification of specific learning disability occurs through an educational psychological assessment where a detailed cognitive profile of the student's strengths and weaknesses, provide a basis for deciding what measures will be needed to enable each individual to study without disadvantage.

The LD classification process explores contrasts, not measures, i.e. not what the intelligent quotient [IQ] or achievement measure is, but more importantly what the distance between these two measures are. Classification / diagnosis through an Educational Psychologist who is experienced in specific learning disability is essential as psychological processing difficulties are the conceptual underpinning of specific learning disabilities.

It is also understood that every person will have a different constellation of strengths and weaknesses, will be affected to a different degree and will have developed more or less effective coping strategies in the course of their education.

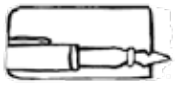
The Educational Psychologist when assessing for specific learning disability has multiple dimensions to define, including cognitive and phonological abilities, auditory and visual memory, auditory and visual perception, inter-sensory integration, letter-sound association, attention, motor skills, receptive and expressive oral language, reading, writing and mathematical skills, processing speed and executive functions such as planning, monitoring and metacognitive abilities.

Prior to exploring psychological processing differences the psychologist is tasked with first eliminating other possible causes of the learning difficulties being experienced, such as a sensory problem (e.g., visual or hearing impairment), emotional disturbance (e.g., depression), environmental factors (e.g., cultural or economic disadvantage or a lack of access to adequate teaching) intellectual disability or severe motor handicaps. Once it is determined that a significant discrepancy exists between the person's potential for learning and their actual achievement with learning, a complete diagnostic evaluation will occur. This involves a battery of assessments focused on a more detailed look at the underlying processes.

Some psychologist will use up to thirty different tests to determine specific learning disability. These evaluations are complex and require a high level of expertise, knowledge and practice by the assessor. For example, just one of the areas to be explored is reading. Effortless fluent reading is the result of a large number of sub processes that must be accomplished efficiently and automatically. In determining skills in reading fluency the assessment process must explore processes and sub processes such as phonemic awareness, letter knowledge, phonemic decoding, orthographic knowledge phonograms, sight words, oral reading fluency and comprehension.

It is through this full assessment that a 'map' is provided to guide the individual. The words of Hutchison (2006, p. 20) highlight how empowering it is to be provided such a map;

> I have learnt that the diagnosis of dyslexia leads to self-awareness ... I felt great relief as I began to understand why certain things were so hard for me - and that I really wasn't dumb after all! I felt like a weight had been lifted off my shoulders.



Identify some myths / misconceptions you or society in general may have about learning disabilities. How would you combat these myths through your new awareness from the information above?

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Research also informs us that the earlier the assessment occurs and the earlier the individual is guided to understand their learning strengths and areas of difficulty the more likely they are to adapt and transition successfully into adult life without secondary characteristics of specific learning disability such as learned helplessness low self-esteem and low self-worth.

In Australia it is less likely that an adult will have been provided the opportunity to undergo a full learning disability assessment during their school years as the school systems in all states, except NSW, are yet to recognise specific learning disability such as dyslexia through their disability support programs. This means that adults with specific learning disabilities presenting at TAFE or University often do not have an understanding of why they have learning difficulties. The first step toward educational support is to facilitate access to an assessment that will provide guidance on learning strengths and areas of difficulty.

Learning Disability and Legislation

As already discussed, in Australia the concept of Specific Learning Disability (SLD) such as Dyslexia, is a controversial issue, with policy within the compulsory education sector leaning toward there being no distinction between Learning Difficulties and Learning Disabilities.

This approach argues that effective teaching – often referred to as Direct Instruction (DI) will assist students to overcome all forms of learning difficulty including specific learning disability such as dyslexia. Many argue that this approach denies the neurological basis and life-long status of specific learning disabilities. It is also argued that it denies the rights of students with specific learning disability under federal law – the Disability Discrimination Act (1992) to receive appropriate accommodations to alleviate barriers to learning in an educational context.

While most other countries (New Zealand, Canada, US, UK and many countries across Europe) recognise specific learning disability as a unique disorder quite separate to learning difficulties, the only State in Australia to formally recognise specific learning disabilities such as Dyslexia within the compulsory school setting is New South Wales (NSW). NSW introduced the *Educational Support for Dyslexic Children Act in 2007*. This Act ensures that students with a specific learning disability are provided additional assistance in the compulsory education setting.

In Australia the adult education sectors such as TAFE and University have also taken a stand and do recognise specific learning disability in line with the definition of disability as defined in the Federal Disability Discrimination Act (1992). The Disability Discrimination Act was designed to provide equitable access for people with disabilities to education and employment and employs a broad definition of disability, and specifically refers to a disability which affects learning as:

> 'a disorder or malfunction that results in the person learning differently from a person without the disorder or malfunction.'

The Disability Discrimination Act is also supported by Disability Standards in Education. The Disability Standards for Education (the Education Standards) were formulated by the Attorney-General under the *Disability Discrimination Act 1992* (DDA).

The Education Standards provide a framework to ensure that students with disability are able to access and participate in education on the same basis as other students. The Education Standards do this by providing clarity and specificity for education and training providers and for students with disability. The DDA makes it unlawful to contravene a disability standard, and compliance with a disability standard is taken to be compliance with the DDA.

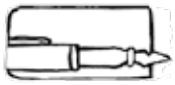
The Education Standards set out a process to be followed to ensure that students with disability are provided with opportunities to realise their potential through participating in education and training on the same basis as other students.

The Education Standards apply to government and non-government providers in all education sectors including pre-school, school, vocational education and training, higher education and adult and community education, as well as to organisations whose purpose it is to develop and accredit curricula and courses.

The Standards cover five areas, these are:

- enrolment
- participation
- student support services
- harassment and victimisation
- curriculum development, accreditation and delivery

The Disability Support Worker is an important player in the education provider's obligations under the Disability Standards in Education, especially in the area of facilitating participation for students with learning disabilities.



Go to the Website
http://www.deewr.gov.au/Schooling/Programs/Documents/Disability_Standards_for_Education_2005_pdf.pdf
Disability Standards for Education 2005

Read the Disability Standards for Education. In your own words explain how each area of the standards is designed to protect students with disabilities from discrimination.

Prevalent Indicators of Learning Disability

The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines literacy as the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society.

English literacy is dominated by a conception of literacy that focuses on a set of discrete decoding skills. From this perspective, literacy - or, rather, reading - comprises a number of sub-skills including: phonological awareness, phonics (decoding), fluency, comprehension, and vocabulary. Mastering each of these sets of sub-skills is necessary for students to become proficient readers.

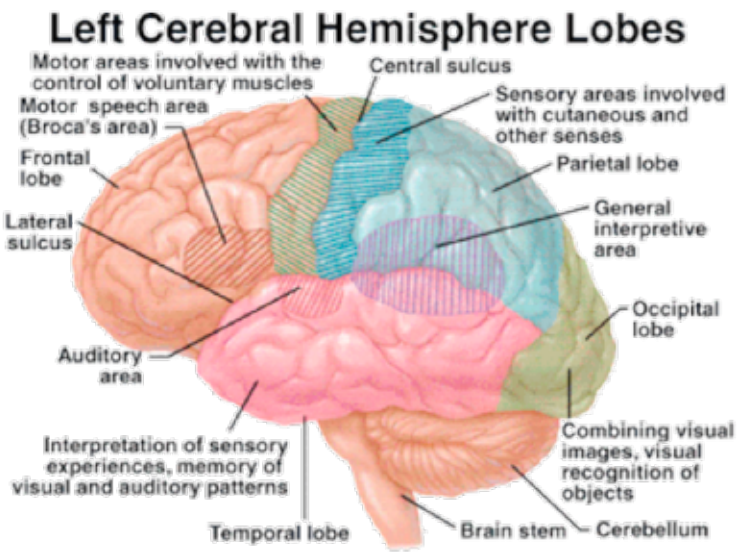
Given that learning to read and spell requires mapping spoken words and 'sounds' to written words and 'letters', and vice versa, the visual and auditory regions of the brain have to establish multiple, complex and bidirectional connections in the course of learning.

People who have a learning disability can encounter difficulties in learning to analyse spoken words into 'sounds' and then to build accurate and precise representations of these sounds in the brain. Consequently, they will have difficulties in mapping the 'letters' of the written words to their corresponding sounds in order to establish

the decoding system for the conversion of written words into spoken words. In turn, this will impede their development of complete and organized phonological and orthographic representations of words.

When we read, we activate complex circuits in two principal areas of the brain which have multiple interconnections, some bidirectional:

- An **auditory** region towards the middle of the brain deals with recognizing spoken sounds and words, and pronouncing them
- The **visual** region at the back of the brain deals with the recognition of written letters and words.



The auditory region deals with the recognition and pronunciation of complete words. We have progressively built representations of words in our brain. These representations of spoken words, which we learn in the course of our lives, are stored in the auditory region of the brain and progressively make up a whole 'dictionary', called the **phonological lexicon.**

The visual region has two functions used in reading. Word recognition is the first function. In the course of our development we also encounter many different instances of each written word, which differ in terms of font, style, height, and which can be written in upper or lower case. Despite these variations, we learn how to recognize written words very quickly and accurately because we have developed representations, or abstract visual forms, of these words. These representations are made up of units (letters or groups of letters) whose forms and relative positions are coded.

The representations of the written words that we progressively build in the course of our lives are stored in the visual region of the brain and also make up a 'dictionary', called the **orthographic lexicon.**

Letter identification is the second function of the visual region. We also develop representations that allow us to identify individual letters corresponding to the 'sounds' of words, regardless of the font, case and style of these letters.

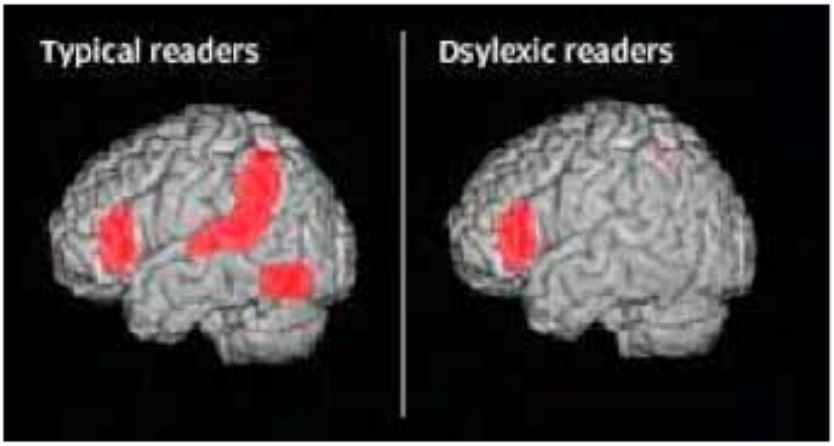
Phonological awareness refers to an individual's awareness of the phonological structure, or sound structure, of language. It is a listening skill that includes the ability to distinguish units of speech, such as rhymes, syllables in words, and individual phonemes in syllables. The ability to segment and blend phonemes is critical for the development of reading skills, including decoding and fluency. Phonological awareness is an important and reliable predictor of later reading ability and has, therefore, been the focus of much research.

Phonemic awareness is a subset of phonological awareness that focuses on recognizing and manipulating phonemes, the smallest units of sound. Phonemic awareness is demonstrated by awareness of sounds at three levels of sound structure: syllables, onsets and rimes, and phonemes. For example, the word football in the General American accent of English is a compound word that contains two syllables, /fʊt/ and /bɑl/.

The first syllable /fʊt/ has an onset, /f/ and a rime, /ʊt/. The individual phonemes in /fʊt/ are /f/, /ʊ/, and /t/. Phonemic awareness is demonstrated by manipulating such sounds, including segmenting and blending the syllables and phonemes in the word football.

The **phonological deficit hypothesis** is a prevalent neurological explanation for the cause of reading difficulties and dyslexia. It stems from evidence that individuals with learning disability tend to do poorly on tests which measure their ability to decode nonsense words using conventional phonetic rules, and that there is a high correlation between difficulties in connecting the sounds of language to letters and reading delays or failure in children.

The basic hypothesis is that reading failure or dyslexia stems from a functional or structural deficit in left hemispheric brain areas associated with processing the sounds of language.



Neuroimaging scan.

Individuals who have learning disability related to visual and/or auditory regions of the brain will experience varying degrees of difficulty with literacy, although it is becoming more and more apparent through the stories of people with learning disabilities that these difficulties can be overcome through creative and meaningful strategies in the teaching and learning environment.

These strategies include inclusive teaching practice and collaborative support implementation with specialist staff that includes the provision of alternate ways for individuals to access, interpret and present information. Understanding the most effective strategies according to the presenting barriers for individuals is key to success in higher level studies for students with learning disabilities.

Given the complex brain functions and the areas of the brain impacted by processing deficits the difficulties for each individual will vary, although difficulties experienced by individuals with specific learning disabilities in the learning environment generally include one or more of the following:

- visual perception difficulties
- misreading words and numbers, losing place, difficulties retaining information over time
- reversals, poor spatial judgement, difficulty copying from board, sequencing and short-term memory problems.
- communication problems (may have difficulty with oral or written language)
- auditory perception difficulties

- difficulty in identifying and discriminating sounds, following instructions, filtering out background noise
- difficulties with self-management
- organisational difficulties
- problems with motor skills
- difficulty with letter formation and neatness of work, slowness in writing

Classification of types of Learning Disabilities

Learning disabilities are sometimes grouped into different categories according to the difficulties experienced by individuals and their primary cause. It is important to note that people experience learning disability differently and will sometimes present with difficulties in one or more of the classification areas. Classification can be quite confusing to the lay person as different professional genres sometimes classify differently, for example, what might be recognized as belonging to the learning disability grouping by one professional body might be considered a stand-alone condition by another professional body.

Below are some brief descriptions of the ways in which learning disabilities may present and be classified. These have been presented under the primary areas of impact of learning disability:

- oral language (e.g. listening, speaking, understanding - Dysphasia)
- reading (e.g. decoding, comprehension - Dyslexia)
- written language (e.g. spelling, written expression - Dysgraphia)
- mathematics (e.g. computation, problem solving - Dyscalculia)

These are important to understand for the Disability Support Worker as adults with learning disability who have not been formally diagnosed often do not have a strong understanding of why they experience difficulties in the teaching and learning environment. Having the ability to identify indicators of learning disability is often the first step in addressing many of the barriers that present in formal education for people with LD. The Disability Support Worker is often in a position where they can spot the difficulties students are experiencing and as a result initiate discussions with the Disability Liaison Officer if they believe that the difficulties the student is experiencing reflect indicators of learning disability.

Different types of Learning Disability

Specific learning disabilities usually fall under the categories of dyslexia, dyscalculia, dysgraphia and dysphasia, although it is also common to hear them defined collectively as specific learning disabilities (SLD). It is estimated that 85% of people with a specific learning disability have dyslexia, although this is difficult to confirm as the literature does not always make the definition between dyslexia and other forms such as dysgraphia. For example, many people present for assistance at TAFE or University with a psychologist report identifying dyslexia as the specific learning disability but writing and spelling difficulties are also features of the disability. This seems to reflect the interconnectedness of the auditory and visual processing areas within the brain and the complex nature of specific learning disabilities. There are apparent interconnections across the four core areas of specific learning disabilities associated with reading, writing, mathematics and oral language. A brief outline of these four areas of specific learning disabilities is provided below.

Dyslexia – reading

Dyslexia is a type of specific learning difficulty (SLD) in which the person has difficulties with language and words. The term dyslexia, although still used by some, is generally felt to be too narrow and SLD is often used to describe these learning difficulties. This is because the learning difficulties are usually broader than just reading difficulties; most children with SLD also have difficulty with spelling. The most common characteristic is that people have difficulty reading and spelling for no apparent reason. The person may be intelligent, able to achieve well in other areas and exposed to the same education as others, but is unable to read at the expected level. Common problem areas include spelling, comprehension, reading and identification of words.

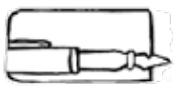
While most people affected eventually learn to read, they may have severe spelling problems unless they get support and specialised education. Dyslexia is not a symptom of low intelligence.

Written words represent spoken words. In order to read and write, a child has to link the sound of a letter with its written symbol. As we have already covered in this learning unit this process is known as phonological coding. The ability to grasp the 'sound structure' of words in this way is crucial to reading and writing. Learning to read and write is a slow process, because written letters have no direct and obvious correlation with their sounds. For example, you can't guess how to pronounce the symbol 'b' just by looking at it - you have to rely on your memory. It is thought that dyslexia could be a problem with phonological coding. One of the early symptoms may be the child's inability to learn or understand rhyming words. Dyslexia or SLD can be hard to diagnose unless the problem is severe and professional advice and evaluation from a specialist educational psychologist is often required. The evaluation may include testing a range of factors including:

- Cognitive (thinking) skills
- Memory
- Vocabulary
- Literacy skills
- Intellectual ability
- Information processing
- Psycholinguistic processing.

Some of the symptoms in an adult could include:

- Reading and spelling problems
- Doesn't like reading books
- Avoids tasks that involve writing, or else gets someone else to do the writing for them
- Better than average memory or difficulties with short term auditory memory
- Often, a greater than average spatial ability - the person may be talented in art, design, mathematics or engineering.



Go to http://www.youtube.com/watch?v=HDUfVCo6ito&feature=rec-LGOUT-exp_fresh+div-1r-1-HM to listen to a brief overview about Dyslexia.

Dyscalculia – mathematics

Dyscalculia is a term referring to a wide range of life-long learning disabilities involving maths. It includes all types of maths problems ranging from an inability to understand the meaning of numbers, to an inability to apply mathematical principles to solve problems. Dyscalculia is estimated to occur in up to 3% of the population.

Simply performing poorly in maths does not necessarily mean that a student has dyscalculia. For individuals with learning disabilities, it may be difficult to visualize patterns, different parts of a maths problem or identify critical information needed to solve equations and more complex problems.

The impact of dyscalculia can affect a person's ability to think quantitatively, do arithmetic, understand and measure time and space and do basic calculations. The psychologist evaluation compares a person's expected and actual levels of skill and understanding while noting specific strengths and weaknesses. Educational psychologists use a series of tests to determine if a person has dyscalculia. An evaluation reveals how a person understands and uses numbers and maths concepts to solve advanced-level, as well as everyday, problems.

The main predictors of dyscalculia include:

- Not knowing which of two digits is larger, i.e. understanding the meaning of numbers
- Lacking effective counting strategies
- Poor fluency in identification of numbers
- Inability to add simple single-digit numbers mentally and
- Limitations in working memory capacity
- Poor mathematical concept development
- Lack of understanding of mathematical terms
- Confusion over printed symbols and signs
- Difficulty solving basic maths problems using addition, subtraction, multiplication and division.
- Poor memory of number facts (i.e. times tables)
- Trouble in applying their knowledge and skills to solve maths problems.
- Weakness in visual-spatial skills, where a person may understand the required maths facts, but has difficulty putting them down on paper in an organized way.
- Frequent reversal of single figures and reversal of tens and units (e.g. 34 written as 43)
- Difficulty in reading text compound, the student's problem in maths.

Dysgraphia - written expression

Dysgraphia can appear as difficulties with spelling, poor handwriting and having trouble putting thoughts on paper. Dysgraphia can be a language based, and/or non-language based disorder.

Many people have poor handwriting, but dysgraphia is more serious. Dysgraphia is a neurological disorder that generally appears when children are first learning to write.

Writing requires a complex set of motor and information processing skills. Not only does it require the ability to organize and express ideas in the mind. It also requires the ability to get the muscles in the hands and fingers to form those ideas, letter by letter, on paper.

Dysgraphia that is caused by a language disorder may be characterised by the person having difficulty converting the sounds of language into written form (phonemes into graphemes), or knowing which alternate spelling to use for each sound.

A person with dysgraphia may write their letters in reverse, have trouble recalling how letters are formed, or when to use lower or upper case letters. A person with dysgraphia may also struggle to form written sentences with correct grammar and punctuation, with common problems including omitting words, words ordered incorrectly, incorrect verb and pronoun usage and word ending errors. People with dysgraphia often speak more easily and fluently than they write.

Non-language based dysgraphias are those caused by difficulties performing the controlled fine motor skills required to write. The generic term apraxia refers to a wide variety of motor skill deficits in which the voluntary execution of a skilled motor movement is impaired. Apraxia can involve a single controlled movement, or a sequence of movements, such as writing a single letter or entire words.

The main predictors of dysgraphia include:

- Generally illegible writing
- Inconsistencies in writing, e.g. mixtures of printing and cursive writing, upper and lower case, or irregular sizes, shapes, or slant of letters
- Unfinished words or letters, omitted words
- Inconsistent position of letters on the page with respect to lines and margins
- Inconsistent spaces between words and letters
- Cramped or unusual grip of the writing instrument, especially
- holding the writing instrument very close to the paper, or
- holding thumb over two fingers and writing from the wrist
- Strange wrist, body, or paper position
- Talking to self whilst writing, or carefully watching the hand that is writing
- Slow or laboured copying or writing
- Large gap between written ideas and understanding demonstrated through speech.
- Difficulty organising thoughts on paper

Dysphasia - oral language

Developmental dysphasia is characterized by significant difficulties in acquiring expressive language in individuals of adequate intelligence in a normal environment without other abnormalities such as intellectual deficit, communication disabilities, deafness, or detectable brain lesions. It affects between 2 and 5% of children who are otherwise unimpaired. Rarer still are severe forms that persist through adulthood. The major characteristics of Dysphasia are:

- Speech is understood better than it is spoken
- Spontaneous speech is better than dialogue
- Fluency of speech is impaired
- Syntactical errors are evident through speech patterns (words out of order or context)

The table to the left provides a summary of the more obvious indicators that might present with a person who has a specific learning disability. In the education environment there are two important contributors providing a clear understanding of the appropriate methods for academic assistance, first the student who can share information about the strengths they have in learning as well as the areas they experience the most difficulty. Second is the psychologist through the educational psychological report and the recommendations for reasonable adjustments provided through this report to facilitate genuine participation within the teaching and learning environment.

Overview of indicators of specific learning disabilities.

General

- Appears bright, highly intelligent, and articulate but unable to read, write, or spell at grade level.
- Labelled lazy, dumb, careless, immature, "not trying hard enough," or "behaviour problem."
- Isn't "behind enough" or "bad enough" to be helped in the school setting.
- High in IQ, yet may not test well academically; tests well orally, but not written.
- Feels dumb; has poor self-esteem; hides or covers up weaknesses with ingenious compensatory strategies; easily frustrated and emotional about school reading or testing.
- Talented in art, drama, music, sports, mechanics, story-telling, sales, business, designing, building, or engineering.
- Seems to "Zone out" or daydream often; gets lost easily or loses track of time.
- Difficulty sustaining attention; seems "hyper" or "daydreamer."
- Learns best through hands-on experience, demonstrations, experimentation, observation, and visual aids.

Vision, Reading, and Spelling

- Complains of dizziness, headaches or stomach aches while reading.
- Confused by letters, numbers, words, sequences, or verbal explanations.
- Reading or writing shows repetitions, additions, transpositions, omissions, substitutions, and reversals in letters, numbers and/or words.
- Complains of feeling or seeing non-existent movement while reading, writing, or copying.
- Seems to have difficulty with vision, yet eye exams don't reveal a problem.
- Extremely keen sighted and observant, or lacks depth perception and peripheral vision.
- Reads and rereads with little comprehension.
- Spells phonetically and inconsistently.

Hearing and Speech

- Has extended hearing; hears things not said or apparent to others; easily distracted by sounds.
- Difficulty putting thoughts into words; speaks in halting phrases; leaves sentences incomplete; stutters under stress; mispronounces long words.

Writing and Motor Skills

- Trouble with writing or copying; pencil grip is unusual; handwriting varies or is illegible.
- Clumsy, uncoordinated, poor at ball or team sports; difficulties with fine and/or gross motor skills and tasks; prone to motion-sickness.
- Can be ambidextrous, and often confuses left/right, over/under.

Math and Time Management

- Has difficulty telling time, managing time, learning sequenced information or tasks, or being on time.
- Computing math shows dependence on finger counting and other tricks; knows answers, but can't do it on paper.
- Can count, but has difficulty counting objects and dealing with money.
- Can do arithmetic, but fails word problems; cannot grasp algebra or higher math.

Memory and Cognition

- Excellent long-term memory for experiences, locations, and faces.
- Poor memory for sequences, facts and information that has not been experienced.
- Thinks primarily with images and feeling, not sounds or words (little internal dialogue).

Behaviour, Health, Development and Personality

- Extremely disorderly or compulsively orderly.
- Can be class clown, trouble-maker, or too quiet.
- Had unusually early or late developmental stages (talking, crawling, walking, tying shoes).
- Prone to ear infections; sensitive to foods, additives, and chemical products.
- Can be an extra deep or light sleeper; bedwetting beyond appropriate age.
- Unusually high or low tolerance for pain.
- Strong sense of justice; emotionally sensitive; strives for perfection.
- Mistakes and symptoms increase dramatically with confusion, time pressure, emotional stress, or poor health.

To summarise the key messages in the training thus far please go to: http://www.ndcovictoria.net.au/Information---Resources/Tertiary-Transition-CDs.aspx and listen to the introduction track on the 'Grasp the Nettle' CD that was written by the Swinburne University Learning Disability research group. This CD also shares the experiences of 11 individuals with learning disabilities who have successfully made the transition into further education. Their stories provide insight in to helpful strategies within the education context.

Theoretical concepts of Disability

People who have a disability are viewed as a minority group; however, they are the largest minority group in the world, comprising over 500 million people, two-thirds of whom live in developing countries. One in five Australians has a disability and most of us will experience a disability at some time during our lives. The term "disability" is an umbrella term used to encompass all disabilities and the varying degrees of functioning within these disabilities. Disabilities can be either congenital or acquired. Persons with a congenital disability have been born with the impairment or limitation as a result of heredity or trauma in development. Examples can include persons with cerebral palsy, deafness, downs syndrome, dysmelia, muscular dystrophy, spinal bifida or blindness/visual impairment.

Persons with an acquired disability have acquired the impairment or limitation later in life due to an accident, illness or disease. Examples are not limited to but can include persons who have a brain injury, acquired deafness or vision impairment, spinal cord injury or people who have had an amputation.

Learning disabilities are generally recognised as a congenital disability and are a disorder in one or more of the psychological processes involved in understanding or using spoken or written language or in processing information.

There are various ways of understanding disability. These are contentious and the subject of much debate but are important because perceptions of people with disability are socially and culturally conditioned. Our understanding of disability influences the way we behave towards them and the way in which we structure our educational institutions and provide academic assistance to students.

Medical Model

The medical model for many years has been the dominant approach to disability. This model locates the "problem" of disability within the individual, rather than in society itself or in the way the 'defective' mind or body is perceived. It is based on the World Health Organisation's (WHO's) original classification system:

- **Impairment:** any loss or abnormality of psychological, physiological or anatomical structure or function.
- **Disability:** any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.
- **Handicap:** a disadvantage for a given individual, resulting from an impairment or disability, that limits or prevents the fulfilment of a role that is normal (depending on age, sex and social and cultural factors) for that individual.

This model has been criticised for promoting the view that individual impairments determine disability and handicap, rather than attempting to explain the way in which society "disables" people. The World Health Organisations intent was contrary to the medicalicalised interpretation of the definition. The intent was to separate the impairment from the disability with the disability recognised as the barriers imposed by society. The medical interpretation is indicative of the era and practices at the time.

Social Model

In contrast, the social model sees disability as a result of environmental and social factors: people with impairments are disabled by barriers in society, by its structures and norms. Alison Davis, a person who identifies as having spina bifida, writes:

> "If I lived in a society where being in a wheelchair was no more remarkable than wearing glasses, and if the community was completely accepting and accessible, my disability would be an inconvenience and not much more than that. It is society which handicaps me far more seriously and completely than the fact that I have spina bifida".

We have a significant opportunity to change that context, to make sure that our society recognises and embraces the needs of all people, including people with disability. So, for example, rather than using the medical model to exclude someone with vision impairment from a laboratory, the way the laboratory is designed in the first place can address the needs of a diversity of people - this inclusive approach benefits everyone, not just a student with vision impairment.

The International Classification of Functioning model

The World Health Organisation recently re-defined disability as a complex interaction between body structures and functions, health issues, and environmental and personal factors which affect the participation of people in activities.

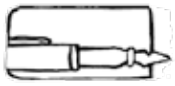
According to the **International Classification of Functioning**, Disability and Health approach, restriction of participation in activities is central to disability, placing emphasis on **impact** rather than cause. Disability can therefore occur to a greater or lesser extent, depending on the fluctuating nature of certain factors. For instance, a person who has trouble spelling and writing in a class or lecture may experience no barrier if the lecturer wears a lapel microphone to record the lecture and then makes the recording available to all students through uploading the audio file to the student system for access. In contrast another student with a print based disability who has no alternative but to take the best notes that they can, may be disadvantaged by the quality and volume of the note taking as a result of their difficulties. In this situation the impact of the disability may be considerable.
Disability is therefore a complex phenomenon that involves environmental factors (such as policies and attitudes), key activities (such as education and employment programmes), personal factors (such as familiarity with assistive technology or orientation and mobility skills), as well as access to appropriate health and disability services. Successful participation in educational and employment activities for people with a disability cannot be achieved without addressing each of these aspects (adapted from ADCET fact sheets).

The social model encourages person first thinking and takes the focus away from the deficit. It is for this reason that a person with disability or the student with a learning disability is now common language rather than the learning disabled child.

The Human Rights Model

A dramatic shift in perspective has taken place over the past two decades from an approach motivated by charity towards people with disabilities to one based on rights. In essence, the human rights perspective on disability means viewing people with disabilities as subjects and not as objects. It entails moving away from viewing people with disabilities as problems towards viewing them as holders of rights. Importantly, it means locating problems outside the individual and addressing the manner in which various economic and social processes accommodate the difference of disability - or not, as the case may be. The debate about the rights

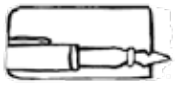
of people with disabilities is therefore connected to a larger debate about the place of difference in society. States parties are demonstrably moving in the direction of the human rights perspective on disability. Recent research shows that 39 States in all parts of the world have adopted non-discrimination or equal opportunity legislation in the context of disability. People with disabilities themselves are now framing their long-felt sense of grievance and injustice into the language of rights.



It is important that disability support workers have a clear understanding of how their own attitudes and values to disability have evolved and how they may impact on the model of assistance provided in the teaching and learning environment. Take a moment to record your beliefs about disability include how you might align with one or more of the models on disability presented above.

Individuals who have not been guided to learn with their strengths often hide their difficulties and experience shame. At the same time they are also not always aware of the compensatory strengths and abilities they may have developed as a result of compensating for their learning difficulties. For example adults with learning disability can also:

- have excellent oral language skills.
- have an excellent memory.
- good "people" skills.
- spatially talented; professions include, but are not limited, to engineers, architects, designers, artists and craftspeople, mathematicians, physicists, physicians (esp. surgeons and orthopaedists), and dentists.
- very good at "reading" people (intuitive).
- often entrepreneurs.



Read the following personal story by W. Davis (accessed from LD online 25th November 2010, http://www.ldonline.org/firstperson/Upside_down_in_a_right_sided_world).

When you have finished explain briefly what it was that you believe turned his world around. What are the messages about success for others with learning disability and for people engaged to assist people with learning disability in an adult learning environment?

Upside down in a right sided world

By: W. Sumner Davis, Ph.D.

The laughter echoed from behind me, and as if a reprieve from on high the bell rang, I could hear the rest of the 3rd grade class shuffling out to the waiting buses. I had been standing at that same board for nearly three hours. Ever since spelling class had begun after lunch, I had been asked to correct the spelling of a sentence that the teacher had written on the board. I could not correct what I did not understand. I could not correct the words because I could barely read. I was not sure of the spelling of any word, save my name. My mother had taught me to spell it when I was five, and I had practiced it over, and over again out loud, much to her dismay I am sure. Apart from my name, I just could not spell anything. I would often reverse letters and numbers; my math skills were far below my grade level. Had I not possessed an incredible memory, I would not have gotten as far as I had.

I always sat next to my friend Roy who was very smart, or at least it seemed so to me. Roy was a good soul who would allow me to peek at his test every so often, enough to get by with a "D" or perhaps even a "C." Yet, on that rainy afternoon Roy could not help me now. No one could. Instead, they laughed, no doubt feeling happy that they were not in my shoes. The teacher, whose name is not important, simply sat at her desk and glared at me. After the rest of the class had exited the room, she explained to me how "disgusted" she was at me. I was a "stupid" child. I was "stubborn" and "wilful." As she explained it, she had hoped the embarrassment I felt at the chalkboard would have "snapped me" out of it. It was for my own good. It always seemed to be for my "own good." Why was it that it only created hatred of education and of educators in me? How could that torment and terror be for my own good? It did not make any sense to me, but I was slow, and perhaps as one teacher had said, "Retarded." There was talk of placing me in a "special school."

This was in 1969 years before the term "learning disability" had entered common language, at least in Maine. Today, I very much doubt that any teacher would behave in the manner of my third grade teacher. At that time she was hardly the only person to explain to me in plain and simple terms that I was "not normal" and that I was most probably "mildly retarded." However, it seemed to have become clear to my teachers by the sixth grade that I was not deliberately trying to fail – but fail I did!
I failed not just in spelling, but English, math, you name it – I flunked it. I remember in seventh grade receiving four "F's" on my report card my first term. My parents explained that I was expected to bring my grades up, and I was "grounded" for the ranking period. It would be impossible for me to accurately describe the way I felt being blamed for my poor performance. I tried to explain to my parents, and anyone I thought might listen that I had "tried as hard as I could" but just could not do the work. There was talk of "holding" me back. I struggled and cheated enough to bring my grades up to passing – barely. My math teacher felt sorry for me, which was obvious in her grading for the next two semesters. She gave me every break she could. My spelling had still not improved much, and any word I did manage to spell correctly was a guess. I managed to just squeak by until tenth grade. After attempting to comprehend algebra and having yet to understand basic math, I dropped out of school. I very much doubt that anyone in the administration was sorry to see me go, as I had worked hard over the past several years to be as big a nuisance as possible. I smoked cigarettes (often in school) I drank beer in the parking lot, I flooded bathrooms and raised as much "hell" as I could. I generally had willing and able assistance. I attended class only when I had "in school suspension" which meant I was caught doing something I was not supposed to be doing. By now, my parents had pretty much given up on me, as had my teachers. I was convinced that education was not for me, and that college or any other school was out of the question. So, at 16 I was a "free man" in other words, I was free to get a job and enter the work force. Without a high school education, the jobs were narrowed down a bit, and work as a labourer for a construction company was about all that I could find. A year or so latter, I managed, barely, to complete a General Equivalency Diploma. This is supposed to be equal to a high school diploma, but I can tell you without hesitation, at least back in the mid 1970's it was not even close. And, it seems this was common knowledge because with my G.E.D the job market did not change.

My construction "career" ended just before my twenty-eighth birthday after scaffolding I had been working on collapsed and a fall of some 20 feet or so landed me in the hospital. Several months later my doctor told me that it would be "unrealistic" to consider going back to work in the construction field. So there I was a dim-witted 28-year-old with no job and no future.

I decided to seek assistance from a vocational rehabilitation counsellor. She was very nice, and seemed genuinely concerned for me.

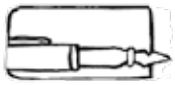
This was a somewhat new experience for me, and the effort she spent on my behalf would never be forgotten. She arranged for me to see a "vocational psychologist" whom after some interviews and testing proclaimed that I was being "unrealistic" in my wishes to attend college. I explained that I wanted to go to college and perhaps obtain an associates degree in some field of social services, perhaps counselling. He explained that the desire to go to college must match ability and I did not have that ability. He was the expert I figured – he would know.

This time however, I did something I had never done before: I decided to ignore that advice of the experts. I began an associate degree program at my local college in human services. It was a struggle to be sure. I am gifted, as I stated earlier, with an exceptional memory, and combined with tutors, I finished the first semester with an average GPA. During the spring break I had the chance to meet with some students who were in the special education program. It was then that I learned about dyslexia, and one or two suggested that I look into it. To my surprise, and relief I learned that I was not mildly retarded or slow as the experts had deemed. I was instead dyslexic. I learned a few tricks, such as "speed reading" where you read only every other word (which enables me to finish a project in a reasonable amount of time), and computer programs such as dictating software that assist me in writing. Math is still a problem, but it is amazing what a person can learn when they are allowed to find their own methods. After my first year in the associate degree program, I transferred to the four-year bachelors program at the university. I graduated after just three years, and went on to graduate school. I earned my first masters degree in psychology in less than two years, and went on to a three-year masters program in divinity where I concentrated on history (where an excellent memory pays off). After my second masters degree, I entered a doctorate program where I earned my first doctorate degree in history. I graduated Magna Cum Laude after four years.

Today I am working toward my second doctorate, a Ph.D. in ecology where I am focusing on evolutionary biology. I have written and published five books on topics from evolutionary biology to religious history and science history. I have published over 20 magazine and journal essays, and my writing has appeared worldwide.

I guess the moral of my story, if there indeed is one, must be that when a person allows others, even the "experts" to decide what is possible for them to achieve, they are already handicapped with that expectation.

I could have decided to follow the advice of the vocational psychologist and become a professional couch potato, but I refused to let others dictate what I could be any longer. From the age of seven until almost age thirty, I knew I was different. What that difference was, I had to find out for myself. I can only imagine what my life would be like today, had I followed the expert's advice.



Go to http://www.youtube.com/watch?v=zhzh9kt8z7c and watch the brief video clip. How simple were the strategies that Rick Lavoi applied for Stephanie in the scenario? Knowing these simple strategies is important for Disability Support Workers as they may be able to share privately with a teacher an idea to implement in the class that will improve participation for a student with a learning disability.

Go to http://www.youtube.com/watch?v=l_qGJ9svUbM to view a brief video of people in the public eye who have specific learning disabilities. Below are a few of the excerpts.

> I was one of the 'puzzle children' myself -- a dyslexic . . . And I still have a hard time reading today. Accept the fact that you have a problem. Refuse to feel sorry for yourself. You have a challenge; never quit! --Nelson Rockefeller
>
> I never read in school. I got really bad grades--D's and F's and C's in some classes, and A's and B's in other classes. In the second week of the 11th grade, I just quit. When I was in school, it was really difficult. Almost everything I learned, I had to learn by listening. My report cards always said that I was not living up to my potential. --Cher
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> I was, on the whole, considerably discouraged by my school days. It was not pleasant to feel oneself so completely outclassed and left behind at the beginning of the race. --Winston Churchill
>
> He told me that his teachers reported that . . . he was mentally slow, unsociable, and adrift forever in his foolish dreams. --Hans Albert Einstein, on his father, Albert Einstein

Section Three

The Disability Support Worker in Tertiary Education

Disability support workers are employed to fulfil the role of specific support services and provide assistance to students with disabilities who are undertaking education and training within an academic environment, workplace, or through flexible modes which can be a combination of lecture or class based, workplace and off campus studies. [1]Disability Support workers are recognized as one of the most important groups in making sure that students with disabilities can participate as fully as possible in the adult education and training environment. The presence of Disability Support Workers frequently makes the difference between students with learning disabilities succeeding in their education and training goals or withdrawing from study.

The various roles within the Disability Support Worker position will differ with regard to the qualifications and training required by individual organisations. At times the position descriptions for the same role will also differ from institution to institution yet across the education sector the fundamental qualities required, in any Disability Support Worker are the same, they are as follows:

- strong interpersonal, communication and organisational skills
- a genuine commitment to providing unobtrusive support to assist students with disabilities to achieve their goals
- awareness of and respect for the rights of students with disabilities; and
- the ability to provide support while facilitating independence and self-determination.

Disability Support Workers are also responsible for treating students, their decisions and their choices with respect through encouraging a sense of independence, autonomy and positive self-esteem, and by honouring the client's rights to dignity, privacy and confidentiality. The catch-words are: 'unobtrusive', 'specific', 'respectful', while facilitating the development and maintenance of 'independence', 'positive self-esteem', 'dignity', 'privacy', and 'confidentiality'.

Reasonable Adjustment

[2]*"An adjustment is a measure or action taken to assist a student with a disability to participate in education and training on the same basis as other students. An adjustment is reasonable if it achieves this purpose while taking into account the student's learning needs and balancing the interests of all parties affected, including those of the student with the disability, the education provider, staff and other students."*

The provision of a disability support worker to facilitate participation in education is one method of implementing a reasonable adjustment for people with a disability. A Disability Support worker is essential when the recommended reasonable adjustment cannot be facilitated by alternate processes solely within the organisation. The tasks requested of the Disability Support Worker are determined through assessment of the student's learning needs, the inherent requirements of the course and the barriers that will impact on full participation. This assessment occurs through the Disability Office of the education provider.

Discrimination

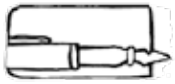
Providing 'reasonable adjustments' and a support worker where necessary is one way of eliminating the risk of treating people with a disability less favourably than people who do not have a disability. When people are treated less favourably because of their disability it is formally recognised as discrimination based on disability.

There are two forms of discrimination that we must be aware of when working with people with a disability. They are:

- *Direct discrimination:* Treating a person with a disability less favourably than another person who does not have a disability, in the same or similar circumstance.
- *Indirect discrimination:* When a requirement, condition or practice that does not appear to be unfair, in fact discriminates against people with a disability.

[1] http://www.adcet.edu.au/Uploads/Documents/Disability
[2] Disability Standards for Education Guidance Notes 2005

There are many adverse effects of discrimination that can impact on a person's life over a long period of time. Research has identified that the most damaging impact of discrimination is long term depression associated with negative self-worth and a lowered self-esteem.



The impact of discrimination

In this exercise you are asked to consider a time in your life when you felt that you were treated 'less favourably' than others. Write down the **thoughts** you had at the time of this occurrence i.e. "this is unfair" "I don't fit in" and then write down one or more of the **feelings** associated with the incident i.e. "anger" "hurt". For many of us these instances are one off's or they don't occur to frequently, for people with a disability the experience of exclusion can occur daily. For example some people with disabilities report they are always late to meetings/class/appointments because there is not enough accessible transport. Others tell the story of not being able to participate in school excursions because the requirements to ensure they can participate have been overlooked.

Go to http://www.fahcsia.gov.au/sa/disability/pubs/policy/community_consult/Pages/2_2_excluded_ignored.aspx and read through section 2.2.1 Social exclusion and lack of community participation section of the 'Shut Out' Report.

Now go back to the thoughts and feelings you experienced when you felt left out. Imagine how this would feel on a regular basis. When we focus on the emotional, psychological, and physiological impact, intentional or unintentional discrimination can have on an individual or group, it is quite devastating.

Record your thoughts here of the impact repeated experiences of exclusion might have on an individual with a disability. In doing this position the person in the context of specific learning disability, i.e. the child who is repeatedly asked to read aloud in class and cannot. What would the long term effects be on this child if they feel anxiety on a daily basis in school?

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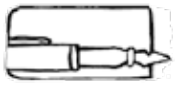

Reflect on the learning so far within this unit around specific learning disabilities. Consider what barriers to participation in education would occur for people with a specific learning disability such as dyslexia. As you reflect also consider what roles a disability support worker might have to minimise exclusion. Record responses below.

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Specific roles of the Disability Support Worker for students with Learning Disabilities

Note taker / Scribe

[3]Note taking is a proven way to provide equal access and contribute to the success of students who have particular disabilities that impact on their ability to write quickly and fluently in a class setting.

Note taking is a major service provided by Disability Support Services in adult education. Training for note takers is often required because:

(i) note taking for another person requires a different set of skills to writing for oneself

(ii) it is an important strategy for developing and ensuring consistency in quality and style between note takers – for example, many students will have more than one note taker

(iii) note takers work in such diverse settings: lectures, tutorials, laboratories, field trips, practical work sessions and having a set of guidelines assists the note taker

(iv) there are issues of health and safety in relation to Occupational Overuse Syndrome that as employers of note takers we need to observe

A note taker not only provides the student with notes but also enables the student to devote their full attention to the teacher, classroom discussion, and/or other learning activities.

[3] http://www.studentservices.utas.edu.au

Specific skills of a Note taker include:

- Strong people skills
- Attentive listening skills
- Strong command of the English language
- Good short-term memory
- Specific content knowledge (not always a prerequisite)

The professional Note taker has a strong ethical approach to confidentiality and a commitment to developing a professional working relationship with both the student and teaching staff.

It is essential that the Note taker and the student determine in partnership the style of note taking that has the most meaning for the student, for example, preferred pen colour, the structure of the page and the manner in which emphasis is highlighted for key points.

Note taking Techniques

[4]Researchers have found that up to 80% of what we learn is forgotten within 24 hours. Taking a good set of notes is therefore critical for revising and for effective learning. Notes should be effective when read months later.

Note taking is not just a matter of filling up line after line, recording everything the lecturer says. You must concentrate on getting the central ideas and concepts and recording them in a manageable format. Well-presented lectures begin with an overview of what will be discussed or a review of past lectures, followed by the body of the lecture. In conclusion a summary is given and here you have the opportunity to check your notes. You may also need to approach the lecturer if anything is still unclear to you at the end of a session.

As well as recording notes from the content of the lecture it is vitally important to the student that all organisational information is recorded. If a lecturer makes an announcement, gives information on examinations, textbooks or room changes this information must be recorded. This information needs to be highlighted as different to lecture content and as important 'other' information. Often a lecturer makes a passing comment such as a possible exam question. Comments such as these are very important to the student.

As a note taker you will listen analytically and identify the following points in a presentation:

a) main headings
b) intermediate headings
c) minor headings
d) points
e) examples
f) references
g) definitions
h) questions
i) answers
j) key points

Space out the main ideas by skipping a line or two or dividing the page into columns. By leaving space at the top, side/s and bottom of the page and between chunks of information, the notes are easier to learn from and process later.

The white space can be used to add:

- content during a lecture when a speaker jumps backward and forwards
- extra notes when a student reviews the notes for exams
- supplementary notes, word meanings or examples for the student
- references.

[4] Adapted from an information brochure by the Centre of Excellence for Students who are Deaf and Hard of Hearing @ NMIT *Promoting access to vocational education & training* & the University of Tasmania website http://www.studentservices.utas.edu.au/

Apart from the format there are many ways to emphasise key points from a lecture:

- underline important words and phrases
- asterisks* can be used
- circling is often used to draw attention to an important point
- boxing is a common method for definitions
- LARGE or PRINTED letters or highlighting can make points stand out

If you are photocopying your notes, be careful. Some highlighters will not show up on the copy and others may delete the highlighted text completely.

If you have taken electronic notes you may need to tidy them up after the lecture, if this is the case you are usually required to email them within 24 hours to the student. The student may also provide a jump drive / USB, which you can hand back at the end of the class if you feel the notes are adequate at that time.

Common Problems for Note takers

Trying to write too much:

To some extent the amount of detail in the notes will depend on the style of the lecturer. If the lecture delivery is unstructured, detailed and rapid, more selectivity will be required to produce meaningful notes.

Panicking:

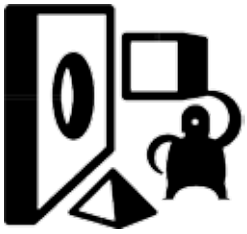
Panicking can occur when the note taker tries to write too much. The listen/store/write process breaks down, and whole blocks of information can be missed.

Neatness vs. fullness:

A fine balancing act is required to produce notes which are attractive and which also contain a maximum of information. In some instances neatness may have to be sacrificed slightly in favour of fullness of information.

Content:

Occasionally a note taker may struggle to understand the content of the lecture. The note taker needs to notify the Disability Coordinator immediately and advise them of the difficulties. Often accessing readings associated with the subject can reduce these difficulties, if this does not assist the note taking task may need to be reassigned.



Poor listening skills:

Note taking requires a high degree of sustained concentration. Note takers who are bored, tired, unwell or easily distracted will not take good notes.

Occupational Overuse Syndrome:

It is essential that note takers take all reasonable steps to prevent workplace injury through overuse. You must develop your own health and safety plan. In doing this, think about the note taking assignments you have. Be strategic about what classes you work in, some are easier than others; try to find a balance in your

day. Moving from two hour lecture to two hour lecture can be physically exhausting, it might be better to role share with another note taker if the student is scheduled in a full day of lectures.

Professional Ethics of the Note taker

1. *Note takers must keep all assignment-related information strictly confidential. Like an interpreter or advisor, note takers do not share information about the students they work with. This includes:*

    - Who in class they take notes for
    - Why the student needs services

2. *Note takers must transcribe lectures as faithfully and completely as possible.*

    - "Transcribe" does not mean a word-for-word record of everything the instructor says.
    - However, note takers must provide a useful and correct set of notes the student can use to study and complete assignments.

3. *Note takers do not use notes to advise, interject personal opinion, or counsel students.*

    - Class notes should reflect the instructor's meaning and intent, without added commentary or opinion.
    - There are times note takers may want to add their own ideas, especially when they are knowledgeable or have strong feelings about the subject. However, the note taker's role is to only convey the instructor's ideas and opinions.

4. *Note takers do not counsel or advise the instructor or students. The note taker's job is to create a tool, but they are not tutors, advisors, or counsellors. The Note-taker should not assume a formal role beyond taking notes.*

    - If there is difficulty that the instructor can address—such as talking too fast or not providing enough time to copy overheads—the note taker can bring it to the instructor's attention, but only in the context of taking better notes for the student.
    - If there is a difficult issue, the note-taker can bring it to the attention of someone with a more formal role, such as the Disability Coordinator.

5. *Note takers behave in a manner appropriate to the situation. Note takers are a part of the professional team that supports students with disabilities. As part of that team, they need to take their role seriously by:*

    - Attending every class they are assigned to
    - Ensuring they provide enough time for the coordinator to arrange for a substitute when they cannot be there
    - Completing note taking tasks responsibly

Adaptive Technology Assistant

[5]The use of computers and ICT (Information Communications Technology) is now a fundamental part of day to day life and accessing the computer can be a significant factor in a user's quality of life. Adaptive Technology is an ever evolving and changing dynamic field as new, redesigned, re-engineered, updated, and emerging technologies compete for attention.

Assistive and adaptive technologies assist in overcoming, or reducing, barriers to full participation in education. Technology is now a recognized resource and tool for removing access barriers within education for students with a broad range of disabilities and is especially prevalent within the intervention tool kit for students with specific learning disabilities.

Assistive products include devices, peripherals, software and customized systems that meet one or more needs. The resources are diverse and varied and cater to individuals who require intervention, support and tools to aid in study, writing, reading, research, planning, organization, problem solving, time management as well as in pursuing leisure options. Students encounter a variety of situations where they may require specific or generic mainstream solutions. Disability Support Workers are trained to understand how Adaptive Technology works and how to train students with a range of disabilities to use the software. Many organizations have a technology area where students can receive one on one tutoring in the use of adaptive technology. The goal is to enable the student to become an independent user of the software and technology. Becoming an independent user equips students to develop skills that they can take with them post education into the workforce. Adaptive technology and its availability within the mainstream has opened the door to many more opportunities for access to education and employment for students with specific learning disabilities.

The following section of this resource is dedicated to raising our awareness of assistive technologies (AT) and the contribution AT can make to enhancing participation in education for students with specific learning disabilities.

[5] usive technologies: Useful Study, Research and Access Tools. Office of Training and Tertiary Education.

Section Four

Assistive Technologies

History of Inclusive Technologies

Assistive technology is a relatively new term used to describe devices and services that lessen or remove barriers faced by persons with disabilities. Although the term is contemporary, the use of assistive technology is not new. For centuries, individuals with disabilities have used a variety of adaptive or assistive devices to help them overcome demands in the environment. For example, years ago individuals with a hearing loss realized that placing a horn to their ear amplified sounds and consequently created a primitive version of today's hearing aid.

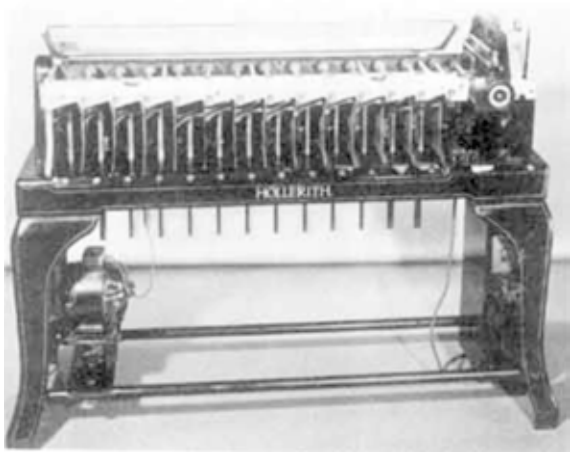
There is no fixed series of events that constitute the history of the development of assistive technology. The growth and development of assistive technology is dotted with events beginning in the 19th century.

In 1808, Pelligrino built a typewriter to help his blind friend Countess Carolina Fivizzono write legibly. People with vision impairment used the typewriter for almost fifty years before it was recognized as a useful device that would eventually transform the process of business communications.

The invention of the telephone was one of the biggest contributions to the way humans communicated. The telephone was designed by Alexander Graham Bell who grew up with a mother who was deaf. Alexander focused on communications for the deaf community. He was particularly interested in a form of hearing through vibrations.

Bell's work with students who were deaf proved to be a watershed event in his life. Drawing parallels between multiple message and multiple notes in a musical chord, Bell arrived at his idea of the "harmonic telegraph." From this idea sprang the invention that made him renowned among inventors--the telephone.

In more recent years assistive technology involved combining this device with a text telephone, known as telecommunications device for the deaf, enabling long distance communication for people who are deaf.



In 1873 Herman Hollerith, a young student whom experts now recognize as having had a cognitive processing disability, designed the first tabulating machine to keep and transport information. They called this little invention the computer. In 1896 Herman Hollerith founded the Tabulating Machine Company. In 1924 the Tabulating Machine Company became known as International Business Machines (IBM).

What is Assistive Technology (AT)?

Assistive Technology (AT) is anything that helps people with disabilities, including learning disabilities and learning difficulties, function at their fullest potential as independently as possible.

Assistive Technologies also referred to as 'Inclusive technologies', exist to enhance people's lives and to create opportunities that might not otherwise be realised. AT has often been referred to as a number of "accessibility options". AT solutions may include the use of switches to control computers, remote-control devices, adapted appliances, ramps, automatic door openers, modified furniture, driving aids, and rehabilitation services. These devices range from the simple, such as penholders or cup holders, to the complex, such as computer voice communication or robots.

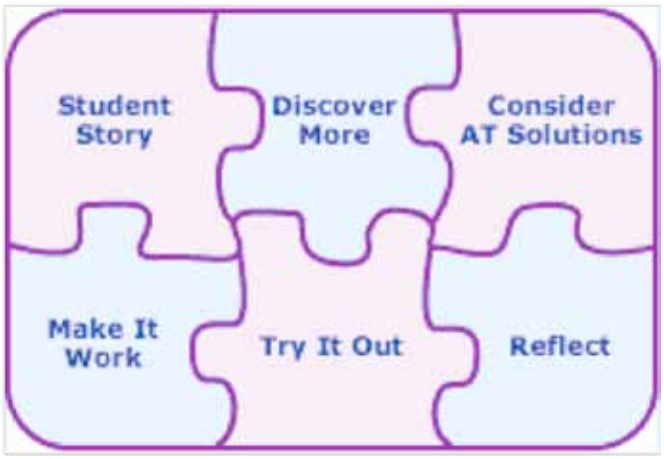
Problems in education and transition through education to employment are associated with the functions needed to participate in learning activities and to prepare for new school settings or post school environments.

Inclusive technologies have proven to assist learners to be more able to negotiate and complete tasks with greater efficiency, confidence and increasing levels of competence. Assistive technologies include educational software, computer adaptations, community-based instruction, and services from an assistive technologist.

Assistive technology is defined as any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of people with disabilities. In today's era of technology there are few reasons for people with a disability being excluded from participating as an integral member of society.

The SETT framework

The technologies chosen to improve participation in education for students with a disability need to be carefully selected to ensure that the person is able to access and use the technologies with a high degree of confidence and competence. The SETT Framework, developed by Joy Zabala (2005), is an organisational instrument to help collaborative teams create student-centred, environmentally useful, and tasks-focused tool systems that foster the educational success of students with disabilities. SETT is an acronym for **S**tudent, **E**nvironment, **T**ask and **T**ools. There are six inter-related components to the SETT framework.



SETT Framework

Key questions are asked in each area to guide teams in gathering data and information to support the consideration and implementation of appropriate inclusive technologies. These questions provide a framework and not a protocol, as they guide the discussion and provide a vehicle for the team to collaborate and form a consensus on 'where to from here'.
The SETT Framework is not a one off event but an ongoing framework for collaborative teams to gather information and ensure that the most appropriate inclusive technology tools are being utilised by the student. As a result there needs to be ongoing Re-SETTing, where teams need to return to the SETT questions on a regular basis. Re-SETTing is a matter of keeping decision-guiding information accurate, up to date, and clearly inclusive of the shared knowledge of all those involved (Zabala, 2002). Given the time spent with individual students in the teaching and learning environment disability support workers are integral members of the collaborative team that explores and determines what the most appropriate assistive technologies might be for individuals. This team will also usually comprise the Disability Liaison Officer, Course coordinators / teachers / lecturers, the ICT consultant and most importantly the student.

In the SETT framework, the student is the person who is the central focus of the educational process. The SETT framework looks at all facets of the student's educational life. When undertaking an assessment of need for assistive technology the student will provide information about the barriers they experience in the learning environment including strategies that have been implemented in other settings to remove these barriers.

The age, gender and cognitive capacity of the student will also need to be considered, this includes intangibles such as attitude, maturity and prior exposure and success with technologies. A series of questions need to be asked during the planning for a student, to assess and determine the appropriate assistive technologies. These questions will be explored by the support team comprising the disability practitioner and disability support worker, teaching program representative and the student. At no time can assistive technologies be prescribed for an individual without this occurring;

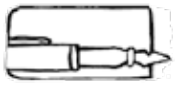
> Technology is a tool that serves a set of education goals, and if we don't think about what we want the technology for first, we end up with technology driven solutions that have very little impact on the lives of people and our educational system. (Roberts, 2010).

Typical questions during the assessment stage will explore the student's experiences in education, the impact of disability in the teaching and learning environment, the current teaching and learning environment, the tasks involved in the learning process and questions around the most suitable technologies.

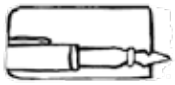
Samples of typical questions from the SETT process are set out below:

- What are the student's current abilities?
- What are the student's learning and participation needs?
- What are the functional areas of concern?
- What are the other students doing that this student needs to be able to do?
- What does the student need to be able to do that is difficult or impossible to accomplish independently at this time?
- What activities take place in the environment?
- Where will the student participate—classroom, home, community, therapy?
- What is the physical arrangement?
- What activities do other students do that this student cannot currently participate in?
- What assistive technology does the student have access to or currently use?
- What specific tasks occur in the environment?
- What activities are the students expected to do?
- What does success look like?
- Are the tools being considered on a continuum from no/low to high-tech?
- Are the tools student centred and task oriented and reflect the student's current needs?
- Are tools being considered because of their features that are needed rather than brand names?
- What is the cognitive load required by the student to use the tool?
- What are the training requirements for the student, family and staff?

SETT information drawn from the Spectronics Webpage at http://www.spectronicsinoz.com/blog/permanent-resources/2010/02/sett/



Investigate the use of the SETT process and explain in your words why it is important in determining a person's AT needs?



Explain how the SETT framework assists in identifying a person' functioning particularly with respect to using Inclusive Technologies and computer related devices?

Examples of Assistive Technologies

Inclusive/Assistive Technologies do not solve all problems nor are they the definitive answer to all problems. They do, however, present opportunities for engagement and empowerment in many teaching and learning situations. Over the past thirty or so years, technologies have matured and become smaller, more discreet yet more powerful and are available at a lower cost and often at no cost through Freeware. By combining commercial products as well as Freeware and Open Source software with any necessary peripheral input or output devices, a set of tools can accommodate a broad range of study, learning and research needs across the curriculum. Once the components are realised and put into place, students with learning disabilities/difficulties can manage learning tasks according to their capabilities without undue restriction and impediment.

Most TAFE's and Universities provide a range of Inclusive Technology resources for students with disabilities that enable engagement and participation, but for some students barriers to participation can be removed by simply developing a broader understanding of the accessibility and other functions already available within mainstream software.

The Functionality of Word Processing and Note Taking software

A word processor (more formally known as *document preparation system*) is a computer application used for the production (including composition, editing, formatting, and possibly printing) of printable material. Word processing was one of the earliest applications for the personal computer in office productivity. Current word processors are powerful systems consisting of one or more programs that can produce any arbitrary combination of images, graphics and text, the latter handled with typesetting capability. Microsoft Word is the most widely used computer word processing system; Microsoft estimates over five hundred million people use the Office Suite, which includes MS Word. Open-source applications such as *Abiword, KWord, LyX* and *OpenOffice Suite Writer* are also rapidly gaining in popularity. Online word processors such as Google Docs are also a relatively new category.

Features and Functions of a Word Processing Program

Word processing typically refers to text manipulation functions such as automatic generation of:

- Indices of keywords and their page numbers
- Tables of contents with section titles and their page numbers
- Tables of figures with caption titles and their page numbers
- Batch mailings using a form letter template and an address database (also called *mail merging*)
- Cross-referencing with section or page numbers
- Footnote numbering, headers and footers
- Chapters and section formatting
- New versions of a document using variables (e.g. model numbers, product names)

Other word processing functions include "spell checking" (checks against wordlists), "grammar checking" (checks for grammar errors), and a "thesaurus" function" (finds words with similar or opposite meanings).

Common features of a word processor include collaborative editing, comments and annotations, support for images, diagrams, video and sound files and internal cross-referencing.

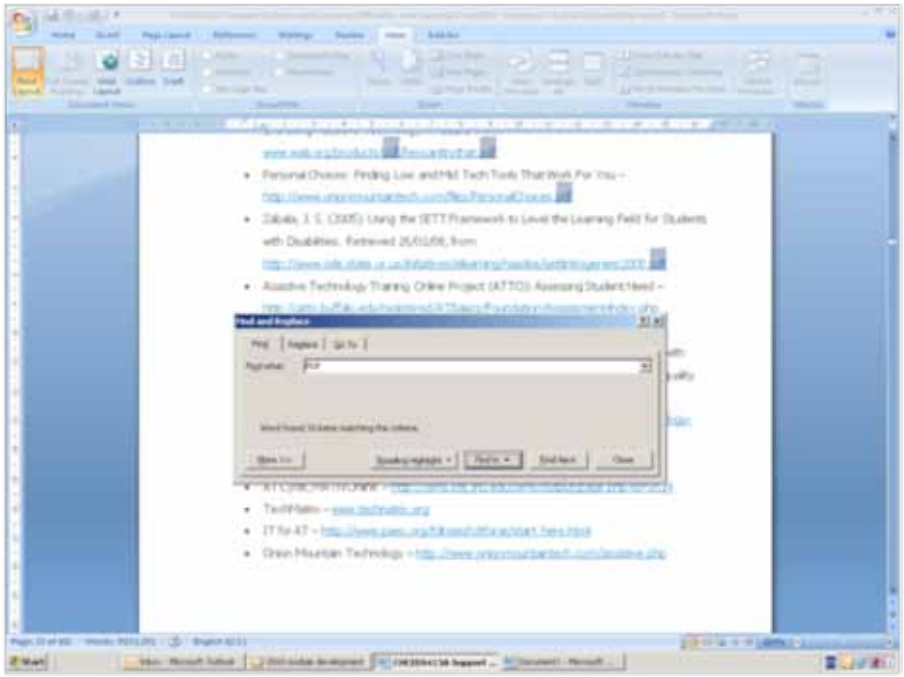
Almost all word processors enable users to employ styles, which are used to automate consistent formatting of text body, fonts, colours, titles, subtitles and selected or highlighted text. Styles greatly simplify managing the formatting of large documents, since changing a style automatically changes all text that has been applied to the style.

Both commercial and free versions of word processors are available for MS Windows, Linux and MAC OS operating systems. The latest software for word processing and text entry is also on the web with programs such as Google Docs. This software is accessed and used whilst online. It offers anywhere, anytime access to software without the need for a program to be installed on a computer – or a particular version of a software program.

There are many handy features that can assist students with disabilities when using MS Word, for example using keyboard shortcuts. The most commonly used shortcuts in MS Word are provided below:

MS Word Shortcut	Function
Control (Ctrl) key and 2 key	Will change line spacing to double spacing
Ctrl key and 5 key	Will change line spacing to one and half spacing
Ctrl key and S key	Brings up the Save dialogue box
Ctrl key and A key	Will highlight the full document
Ctrl key and P key	Will bring up the print window
Ctrl key and Z key	Undoes the last action (or the redo function)
Ctrl key and X key	Cuts
Ctrl key and C key	Copies
Ctrl key and V key	Pastes
Ctrl-key and I key	Will action italics (with text already selected)
Ctrl-key and B key	Bold
Ctrl key and U key	Underline
Ctrl key and F key	Find word or phrase in a document
Three clicks	Will also highlight or select the full document
Double clicking on a word	Will highlight it.
Double-clicking in the margin	Will highlight a paragraph

A very useful shortcut in MS Word for students with a learning disability is the *Control F - word find* function. This simple function can reduce the need for students to scan full documents – a process that is time consuming and impacts fatigue levels when reading difficulty is a factor of the specific learning disability.

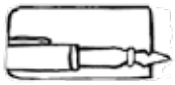


Control F - Find Word Function

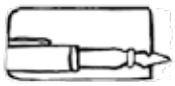
To assist students with learning disabilities, a number of features can be utilized to assist in the creation of text or in reading it. Wordtalk V3.6 is a free program that has a number of functions, all readily accessible from a toolbar that resides within the software (e.g. as an Add-in in Word 2007) and as a toolbar in Word 2000/2003 versions of MS Office. It offers text-to-speech (i.e. text voiced as a whole document, paragraph, sentence or word) and a voiced spell check and thesaurus. Users can listen to text for appraisal, in editing mode or for leisure.

The voices can be used for a number of purposes but in the main they facilitate increased independence as students can listen to passages of text repeatedly, this assists with retention, comprehension and enhanced understanding. Text-to-audio also provides options for saving text as an audio.

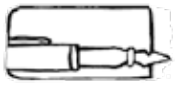
Fx Toolbar (http://www.fxc.btinternet.co.uk/assistive.htm) also offers text-to-speech as well as text highlighting. This toolbar is designed as an add-in for *Microsoft Word 2007*. Unfortunately it does not work with any other version of *MS Office*. The toolbar gives users a number of options to highlight and collect parts of the text into a new document, speak highlighted text, identify words and change the case of the selected text. The speak function within word processing can assist students to hear the words they have written to determine their appropriateness. Being able to independently proof read/hear written work and make the appropriate changes is a critical element of success in study that students with learning disabilities/difficulties can often not do independent of assistive software applications.



Identify four functions in MS Word (Windows or MAC OS versions) that can assist students with the creation of text?



Identify four functions in MS Word (Windows or MAC OS versions) that assist students in formatting and outlining text?



Identify four functions within MS Word (Windows or MAC OS versions) that assist students who experience reading difficulty and explain their application and benefits for students with learning disabilities/difficulties?

Working with PDF (Portable Document Format) Files

Portable Document Format (PDF) is the de facto standard for the secure and reliable distribution and exchange of electronic documents and forms around the world. Teachers and students have been using this format for over 16 years. There are also versions that run on portable hand held devices such as PDAs (Personal Digital Assistants), mobile phones and iPods.

Many companies that produce teaching, resource, factual and other related learning and study media have used the PDF standard for efficient and global delivery using CDs, DVDS and in latter years, web sites. Early user manuals were previously published on floppy disks.

Now millions of documents are created daily and distributed in every possible enterprise and for a multiplicity of uses. The introduction and proliferation of the World Wide Web witnessed an explosion of deployment of PDF documents. Anyone can read the documents, print and to a degree, edit part or the entire document. As a file standard, it is program independent and there are now many free readers – including the latest version from the originators of the software – *Adobe Systems*. The freely downloadable Adobe Reader is at version 9.3 as at October 2010 and can be accessed from http://www.adobe.com/products/reader/ .

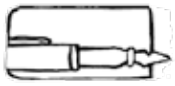
The protocols and restrictions applied to PDF documents provide for necessary security but can also disenfranchise some users who require accessible format – especially students who have different learning styles, vision impairment or other learning, reading difficulties. As PDF files can be difficult to read, or navigate, there have been some excellent innovations from a number of different companies to support users with disabilities. The textHELP company in Ireland provide PDF *Accessibility Editor* in textHELP Read & Write software. PDF *Accessibility Editor* is a set of tools designed to work with Adobe Acrobat that allow the Publisher to dramatically improve the end-user accessibility experience when reading PDF files.

The key benefits include:

- Ability to define the reading order of the document
- Fine tune the pronunciation of words and alternate text
- Prepare education textbooks to be converted into accessible DAISY format
- High quality speech feedback with highlighting in Adobe Acrobat.

Claro Software is a leading assistive technology company in the UK. ClaroRead software allows PDF files to be spoken aloud and be converted into *Microsoft Word* format with the *ClaroRead Plus* edition. Claro software produced a standalone *Accessible PDF* reader, which is available as a free download. It will convert accessible PDF Files into a web page style retaining the original format and layout or a simple text only view. It can be downloaded freely from, http://www.clarosoftware.com/index.php?cPath=314. With this software you can zoom in and out, use high or low contrast colours, and save your PDF as text or reversion it as a web page. You can also follow internal contents links to navigate the document. There are a number of text to speech software applications that will work with PDF documents these are discussed under Text to Speech.

PDF creation, reader programs and web resources assist educators, support staff and trainers to provide the required resources in accessible formats. Converting PDF content to text or more graphic based documents into RTF, MS Word or Writer documents creates opportunities for increased access to learning resources and as a result improved participation for students with disabilities.



Why is it important for students with learning disabilities to be able to access PDF documents?

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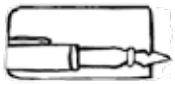


What tools exist to re-version PDF files and what do they do to assist students who find reading, retention and comprehension difficult?

DAISY File Format

Digital Accessible Information System, or **DAISY**, is a talking book format presented with enabled navigation within a sequential and hierarchical structure consisting of (marked-up) text synchronized with audio. DAISY assists people who for different reasons have problems using regular printed media. DAISY books have the benefits of regular audio books, but they are superior due to the embedded navigation levels (currently six in the DAISY 2.02 standard), the content (i.e. other objects such as images, graphics) and display of synchronized text to speech.

DAISY books enable users who are blind or have print based learning difficulties to navigate the most complex of texts. DAISY Multimedia includes:

- A talking book or computerised text,
- A synchronised presentation of text and audio produced according to the DAISY Standards.

DAISY is a way of preparing an audio book, usually on CD, that allows the reader many more options than those available with any of the previous cassette or audio CD books.
A body of experts responding to suggestions from blind or vision-impaired readers from around the world developed DAISY in 1995. Since then it has proven to be a valuable resource for people with other forms of print disability such as dyslexia. DAISY is a very flexible and expansive format with numerous benefits to a wide range of users. It is quickly becoming a standard format that will enable struggling readers, students with learning difficulties/disabilities and others to access text in a faster, more organized and elegant manner.

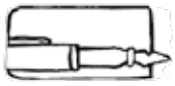
DAISY books can be distributed on a CD or DVD, a memory card or through the Internet. DAISY books can be listened to on standalone DAISY players, computers using DAISY playback software such as AMIS, mobile phones, and MP3 players – (albeit with limited navigation functionality). A computerized text DAISY book can be read using refreshable Braille display or screen reading software, can be printed as a Braille book on paper, converted to a talking book using synthesised voice or a human narration, and can also be printed on paper as large print text. In addition, it can be read as large print text on a computer screen.

With links between text and narration, DAISY books allow a reader to go directly to specific sections, chapters or pages, and place multiple bookmarks. The ability to easily navigate around the book is not available with books on tape or CD. When a user finishes reading, a digital playback device will "remember" where the text is stopped, and resume play at that same place when the user resumes reading. An entire DAISY book can be contained on one CD. Up to 50 hours of audio may be contained on one DAISY CD - the equivalent of more than 30 standard cassettes.

There are definite benefits for students

- The ability to place multiple bookmarks and move around quickly enables students to find relevant material quickly.
- DAISY navigation is excellent for skipping to sections in reference books.
- The DAISY structuring allows essays to be completed to academic standards with footnote details and bibliography made possible.
- Some digital playback devices are available that have the ability to record voice, narration, additional comments etc., which is useful for recording lectures.

Experts believe that the two most likely standards for re-versioning and publishing text and books in the future will be through *MS Word* and *DAISY* formats. DAISY is especially valuable as it can be reformatted quickly into all other formats including plain text, HTML, Braille, large print and MS Word. DAISY has many benefits in accessing text due to the very powerful and flexible navigation. More recent developments with DAISY include the *InDaisy Reader* an application for Iphones and Ipads.



Locate three web sites that offer information about DAISY readers in Australia.

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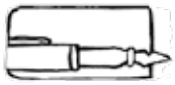


Highlight the features of DAISY outlining the benefits it provides for students with learning disability/difficulties.

OCR (Optical Character Recognition)

Optical character recognition 'is the mechanical or electronic translation of images of handwritten, typewritten or printed text (usually captured by a scanner) into machine-editable text. Optical Character Recognition (usually referred to simply as **OCR**) software has been used for many years in education, research and business. It provides access to text in all manner of printed materials. OCR software makes it easy to re-use and access existing printed or online documents with perfect formatting. Converted documents can look exactly like the original – complete with colour, columns, tables, bullets and graphics.

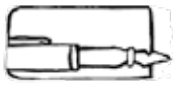
Capturing an image can be performed in a number of ways. The Dots per Inch (dpi) is an important consideration as the file size grows exponentially with more 'dots'. Increased resolution means greater clarity and usually improved performance and accuracy. Some paper or material (e.g. magazines) may cause problems with glossy surfaces. These are issues that require attention ad some scrutiny when first experimenting and using OCR software.

Any scanning device can benefit from the power of unlocking and sharing information stored on paper as accurately reproduced digital documents. They can be reversioned as PDF, MS Word, HTML documents or as plain text. Various OCR programs provide the speed, accuracy, quality and features to maximise the benefits of current scanning or all-in-one devices. The device or scanner used needs to be OCR capable or can save/ convert a file in a format that can be used by scanning software.

With most flatbed scanners, photocopiers or printer-scanner models, converting information that was formerly 'locked' on paper or in digital files in a preferred format, is made simple and easy. Once material is converted it can be edited, altered, enlarged, moved around and also utilized by text to speech software.

OCR software is also available for mobile devices such as mobile phones. The phone camera allows the user to take a picture of a set of text the OCR software enables the conversion of that picture into digital text. Text reading software such as CapturaTalk can then be utilized to read the text aloud through a text to speech function. The

focus on assistive technology for portable and mobile devices has improved access for people with print disability, allowing students to have access to the software, anywhere anytime. Students who have difficulty with reading can now experience independence utilizing mobile OCR and text to speech software.



List as many advantages as you can to explain why being able to scan text is an important aspect of facilitating inclusion for students with print based disability? Include in your responses examples of how scanning text could be used in a teaching and learning environment.

Text-to-Speech software

A text-to-speech system (or "engine") is composed of four parts: a front-end and a back-end. The front-end has two major tasks. First, it converts raw text containing symbols like numbers and abbreviations into the equivalent of written-out words. This process is often called text normalization, pre-processing, or tokenization. The front-end then assigns phonetic transcriptions to each word, and divides and marks the text into prosodic units, like phrases, clauses, and sentences. The process of assigning phonetic transcriptions to words is called text-to-phoneme or grapheme-to-phoneme conversion. Phonetic transcriptions and prosody information together make up the symbolic linguistic representation that is output by the front-end. The back-end, often referred to as the synthesizer, then converts the symbolic linguistic representation into sound.' Speech synthesis is the artificial production of human speech. A computer system used for this purpose is called a speech synthesizer, and can be implemented in software or hardware. A text-to-speech system converts normal language text into speech; other systems render symbolic linguistic representations like phonetic transcriptions into speech. The quality of a speech synthesizer is judged by its similarity to the human voice and by its ability to be understood.

Text-to-Speech (TTS) software has existed ever since the early microcomputers appeared in homes and schools in the early 1980's. Special voice cards or external synthesizers (e.g. *Echo II on Apple II* computers) provided robotic, synthesized male voices.

Programs that offered voice feedback often used the small low-quality computer speaker to speak aloud the key words, commands and phrases. The voices were approximated and of low quality and volume – but critically provided access to computers for blind and vision impaired users. Choice was limited, yet users who required voiced instructions, directions and feedback were grateful for the pioneers of early TTS technologies. Early TTS word processing and text editing software (e.g. *Dr Pete's TalkWriter and IntelliTalk V1*) began to appear along with small utility applications (e.g. *MacTalk* on Macintosh computers). MacTalk was a revelation as the speech quality was more acceptable and the range and variety of voices were more advanced than programs on other platforms (e.g. BBC, Amiga, Atari and early IBM DOS). Funny or amusing voices such as parrots, robots 'silly' voices were introduced in games for younger children and eventually some female voices began to appear.

The TTS programmers designing and improving this technology were originally working in the southern states of America. The voices had an American sound, were still quite robotic, nasally and had an 'accent'. Some educators found this challenging, yet students of all ages worked with the technology as it provided opportunities to interact with software, listen to instructions, and word process with auditory feedback. The synthetic voices and human voices now available have vastly improved text to speech software. Text-to-speech technology allows users to work with their sense of hearing.

A software program *WordTalk V4* available at www.wordtalk.org.uk/Home/ is a free text to speech plug-in developed for use with all versions of *Microsoft Word* (from *Word 97* upwards). This software will speak the text of the document and will highlight it as it goes. It also contains a talking dictionary to help decide which word spelling is most appropriate. The latest updates to *WordTalk* also have the ability to convert the text to MP3 or WAV format. This is recognized as text to audio and will be explained in more detail in the next section of this guide.

WordTalk is designed to assist people with specific learning difficulties including dyslexia, some visual difficulties and people for whom English is a second language. Keyboard shortcuts are also available for all actions. Once downloaded the WordTalk tool bar sits within Microsoft Word and can be launched automatically when Word is used or manually as required.

The speech works with sections of a document that have been clicked on with the left hand mouse button held down (or using keyboard shortcuts) i.e. paragraphs, sentences, words or individual letters. WordTalk can also read letters and words as they are typed. Text is highlighted in a chosen colour as the synthesised voice speaks. A choice of voices are available from the toolbar with speed and volume customization. When spell checking using the Word dictionary, WordTalk will say the words, this is very helpful to differentiate similar looking words.

Text to Speech software will come with its own human or synthetic voices but will generally recognize other voices that might be pre-loaded to a system. There are two popular Australian real voices, one male Lee, and one female, Karen. These are packed with most textHELP products and Claro Software programs and are licensed to these companies for inclusion in their literacy support programs.

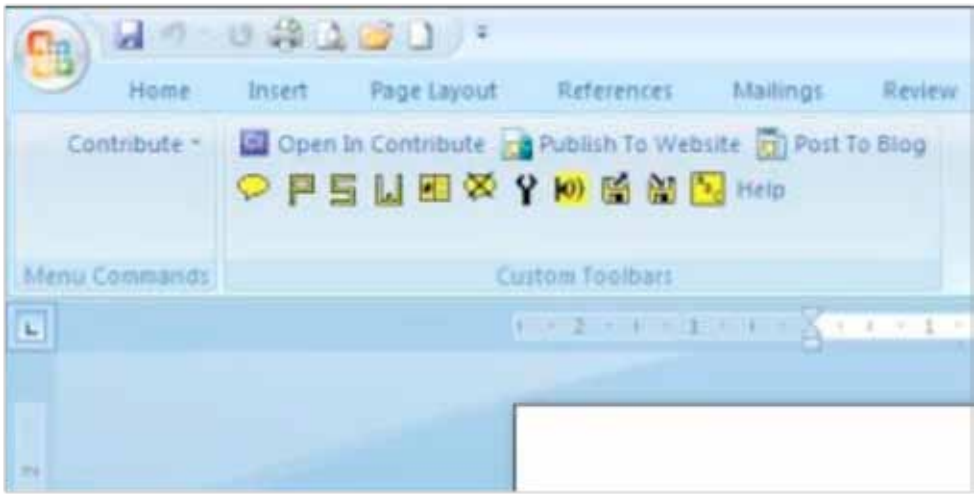
Listening to text can be accomplished on a computer, or using more portable devices such as mobile phones, iPods and MP3 players.

With Text to Speech (TTS) software students can listen to their own work to proof read and check for errors. Editing using TTS allows users to identify and amend various mistakes. Students can check for:

- Missing words
- Added words or repeated unnecessary words (e.g. 'the the')
- Misspelt words that don't "sound right"
- Overly long sentences
- Sentences that contain too many conjunctions
- Short sentences
- Sentences that do not adequately convey meaning
- Clumsy or ill constructed thoughts and ideas
- Documents that require additional formatting (e.g. paragraphs)
- Words that are voiced in unexpected ways
- Words that are inappropriate or used in an incorrect context

When used for reading third-party text, students may:

- Listen to new text with a male or female voice
- Slow the voice or speed it up
- Listen with highlighted text (this can assist with developing word recognition)
- Listen with a choice of different text and background colour combinations
- Listen through headphones (for private writing or text that is not for public consumption)
- Listen repeatedly to reinforce learning



WordTalk 4.2

Many students with specific learning disability or other learning difficulties can find reading and consequently retention, extremely difficult. Students who use TTS explain that it has enabled them to become independent learners with an increased confidence in creating and reading text. By using this software students report that they rely less and less on family members, peers or educators to read or clarify part or whole documents.

Other easy to access Text to Speech (TTS) programs

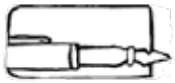
ReadPlease 2003 – www.readplease.com. This program has a few limitations but it can read files with many other languages i.e. French text spoken in a French speaker's voice, as with Italian, German, Spanish and other languages. These are also free to download, install and use.

Natural Reader V9 – www.naturalreaders.com. uses SAPI 4 and the higher quality SAPI 5 voices. The program can be used as a floating toolbar. By selecting text with Adobe Reader or Foxit Reader, the user can listen to text being voiced aloud.

AccessApps – http://www.rsc-ne-scotland.ac.uk/accessapps/. This is a suite of applications that are known as Portable Apps. They are installed onto external memory drives e.g. thumb or USB drives and provide a number of inclusive software applications that are all easily accessible from a menu system, including DSpeech.

DSpeech is a text-to-speech program that has some great benefits. It operates from a USB drive so it does not need to be installed on the computer being used. This means that students can carry the software on the USB and have it available to them regardless of the computer system they are working from.

In the *AccessApps* list of portable programs, two PDF readers are available. *Foxit Reader* and *Sumatra PDF* will both open PDF files. *Sumatra PDF* is designed for portable use. Only one file at a time can be opened so users can run it easily from an external USB drive.



In what situations or context would text-to-speech assist a person struggling with the:

Creation of text

Reading text

Comprehension of text

With the Text to Speech range of software there is a great deal of choice. Generic programs cater to all age groups and abilities. Other software utilities and programs suites cater more specifically to younger students in pre-school, primary or special settings. More comprehensive and expansive programs deliver multiple options and features and therefore suit older or more capable users. The following categories include software that will predominantly cater to and accommodate users who have different learning, access or communication needs.

Commercial Software with Text-to-Speech – Younger Students:

Clicker 5 ANZ	www.cricksoft.com (uses onscreen grids and templates with graphics & photos)
Textease	www.textease.com ("click and write" anywhere WP - part of Textease Studio CT)
IntelliTalk	www.intellitools.com (talking WP - part of the IntelliTools Classroom Suite V4)
Write:Outloud V3	www.donjohntson.com (talking WP - part of the SOLO suite of programs)
Max's Toolbox	http://www.maxstoolbox.com/products/maxwrite - works with MS Office
Draftbuilder	www.donjohntson.com – predominantly text based organisational and planning with templates for structured writing scaffolding and supports
Kidspiration	www.inspiration.com – mind mapping using multiple templates and webs. Ideal for planning and organisation with extensive graphic library, thesaurus and TTS
Writing with Symbols 2000 V2.6	http://www.widgit.com/ (older program but still used widely in special schools)
Communicate: SymWriter	www.widgit.com (updated version of WWS with additional features & PCS symbols)
Communicate: Webwide	http://www.widgit.com/products/communicate/index.htm - symbol based web browser with speech
Boardmaker 6 and Boardmaker Plus	http://www.mayer-johnson.com/ – a program that has DTP and WP functions with over 9000 PSC symbols

Commercial Software with Text-to-Speech – Senior Students and Adults:

textHELP Read & Write V9; ClaroRead for PC 2008	www.texthelp.comn or www.spectronicsinoz.com http://www.clarosoftware.com or www.spectronicsinoz.com
Kurzweil 3000	http://www.kurzweiledu.com
Wynn Wizard from Scientific software	http://www.freedomscientific.com/LSG/products/WYNN.asp or locally from http://www.quantech.com.au/wynn)
BrowseAloud	http://www.browsealoud.com/page.asp?pg_id=80004 – will voice web sites that are BrowseAloud friendly. It works with MS Internet Explorer and FireFox.
WordQ	http://www.wordq.com/ - it has natural sounding text-to-speech, in-context prediction for corrections with usage examples for confusing words and the predictions are based on creative spelling

These software programs all provide quick and elegant access to print materials together with a number of different learning supports, potentially including spell checking, word prediction, thesaurus and dictionaries, text to speech with human sounding voices, text-to-audio conversion, other visual and auditory features and organisational and planning tools.

Freeware- Text to Speech programs and Utilities:

Natural Reader V7	www.naturalreaders.com – is a very useful free program that will use SAPI or SAPI 5 voices. It runs as a floating toolbar as well as full screen. Will voice MS Internet Explorer.
ReadPlease 2003	www.readplease.com – It runs in a small window but has multiple language support, SAPI 4 voices and easy to use font resize slidebar. Freeware.
Deskbot	http://www.bellcraft.com/deskbot/ - DeskBot is a freeware, multi-featured Clipboard Reader, Text Reader, Time Announcer, Desktop Application featuring Microsoft Agent Animated and a range of talking characters. Freeware
Cliptalk	http://fullmeasure.co.uk/cliptalk/ - automatically speaks text that is copied to the Windows clipboard (e.g. with Right Click-Copy or Ctrl + C) Freeware
TextAloud V2.2	http://www.nextuptech.com/ - create MP3 or WMA files for use on portable devices like iPods, Pocket PCs, and CD players Uses AT&T, Acapela and/or RealSpeak voices) Free trial, then Shareware.
WordTalk V4.2	http://www.wordtalk.org.uk/Home/ WordTalk is a free text-to-speech plug-in developed for all versions of Microsoft Word (from Word 97 onwards). It will speak the text of the document and will highlight text it as it goes. It contains a talking dictionary to help decide which word spelling is most appropriate. Also converts text to audio in MP3 or WAV formats. Open Source/Freeware
PowerTalk V1.2.1	http://fullmeasure.co.uk/powertalk/ - PowerTalk is a program that automatically speaks any presentation or slide show running in MS PowerPoint for Windows. It uses SAPI 4 or 5 voices. Freeware.
DSpeech V1.55	http://dimio.altervista.org/eng/ - Allows the user to save the output as a .WAV, .MP3 or OGG file and quickly select different voices, even combine them, or juxtapose them in order to create dialogues between different voices.

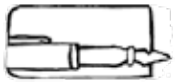
Text-to-Audio

As we have already outlined in the 'text to speech' section of this workbook, there are numerous programs and web services that exist to alter text to speech. Creating sound files from recordings and from electronic or scanned text also allows users to listen to information on a computer or on a more portable device. These include MP3 players, such as iPods, iPod Touch models, iPhones, MP3 players, most mobile phones, Portable Digital Assistants (e.g. Palm, HP iPaqs) and even digital cameras. It is a matter of locating a text-to-speech program, utility or web service that converts text to an audio format of your choosing. Text-to-audio technology has matured over the past few years. It is being used in the business, telemarketing, telecommunications and telephony markets and should be an important aspect in education for all students. The portability and ease of access is available to students of all abilities. Programs use either SAPI 4 or SAPI 5 voice technologies to speak or voice the text in a document on the computer and then also convert it to an audio file. The text, once converted from a third party source or from personal writing in MS Word or word processor, email or web site to a suitable sound file, can then be played back:

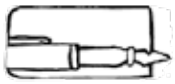
- On a computer using speakers, amplification or sound system for private or public performance
- On a computer for a student to read along with the text on screen
- At any time to read a paper-based version for editing, fluency, practise or study
- For memorising content
- For rehearsing purposes (e.g. in practising the delivery of a speech)
- Using headphones (for privacy or reflection or for use in public spaces)
- To read a section, part of or an entire book
- To listen to a web site or email offline
- To proof read a student's own writing
- To attend to instructions or directions
- To follow a list of ingredients or method in a recipe
- To listen to a 'talking book" for leisure or fun
- To listen for meaning, clarity or to assess and appraise

Listening to audio, or listening whilst reading the corresponding text, can improve understanding and access to text-based data. The quality of the audio is dependent on the program that records it, the environment in which it is captured, the synthesised voice use, the format in which it is stored and the player and speakers used in playback. Portable players can be used to listen to MP3, WMA or WAV files in any location, at any time for any purpose. Headphones provide for private listening or in busy, noisy environments. Reading through listening to emails, web chat, web sites, blogs, Nings, Wikis, Twitter and RSS feeds and other online content also opens up a world of opportunities for engagement and access to social groups, news and events.

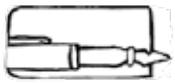
Students of all abilities can benefit from this technology. It can be performed quickly online or more formally using free or commercial applications.



Locate four sites that offer text based material converted to MP3.



Locate four sites that convert text to audio online.



Convert text to an audio file in software such as Balabolka or DSpeech and listen to the text as you read the original. Write a brief explanation on how might this technology assist struggling readers or students with learning disabilities?

Speech Recognition (SR) software

One of the most sought after inclusive technology products for students is a technology that was originally designed for commercial use in the US, in health care. Speech recognition software was designed with a focus to reduce the workload of the medical transcriptionist. Voice recognition software (VRS), also known as speech-recognition, automatic speech recognition, ASR or natural language recognition software, converts your voice to text on a computer. What this means is that you can create text files without typing. When you speak through a microphone (most voice-recognition software includes this accessory), the software "translates" the sounds into written words.

People with a range of different disabilities have benefitted from using speech recognition programs. It is especially useful for people who have difficulty with or are unable to use their hands, for example people who used the keyboard continually over a period of time and developed RSI became an early market for speech recognition.

Speech recognition is also commonly used in deaf telephony, such as voicemail to text, relay services, and captioned telephone services. Many industries now rely on Voice and/or Speech Recognition for a range of automated tasks, including communications, artificial intelligence and security systems.

Users with learning disabilities who have problems with thought-to-paper communication (they formulate ideas that are processed incorrectly causing them to end up differently on paper) are experiencing positive outcomes from using this software.

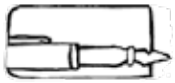
There are certain prerequisite skills and understandings as well as age considerations required to effectively use voice activated software, in particular the ability to plan and speak coherently to formulate ideas and to speak clearly with some fluency and control, using consistent speech patterns with sufficient volume and clarity.

The speech recognition software has matured over the years with current leading products now fulfilling promises made by vendors quite a few years ago. The speed, performance and memory constraints have largely been resolved and cost is no longer a major issue. Hardware, both desktop and portable computers (namely Notebooks and even Ultra Lights) can be purchased and configured to perform with more than satisfactory results for many users. Versions are available for *MAC OS* and *MS Windows X, Vista* and *Windows 7* operating systems.

Speech Recognition software is designed for single use at any one time, i.e. the software is trained to recognize a person's voice and only that person can access the files saved to that voice. It is therefore not a tool for transcribing events such as meetings where multiple voices are present. With the evolution of speech recognition software users can now use portable USB dictating devices for recording and transcribing at a later date. This is an excellent resource for students.

The most common Speech Recognition Software is a commercial product called Dragon Naturally Speaking. This product can be researched further at www.nuance.com/dragon/index.htm.

There are also freeware versions of speech recognition software available such as **e-speaking** software available for download at: http://www.e-speaking.com/ and **Voice Finger** designed for Windows Vista and Windows 7 that enables you to control your mouse and keyboard just using your voice, in a fast way. Voice Finger has several improvements over the Windows default speech recognition tools and was designed by a person who relies on speech recognition software. This software can be downloaded from http://voicefinger.cozendey.com/



Using the SETT model explain how you would determine the appropriateness of Speech Recognition software for an individual with a specific learning disability – include how you would determine its suitability and the prerequisite skills a person would require?

Word Prediction Software (WPR)

Many people think of *WPR* as the software in their mobile phones that provides predictive text. There are now a number of different technologies, all offering different pathways and solutions. Word Prediction *(WPR)* software was developed many years ago and meets a number of different text-entry needs. Word prediction allows students to use predicted words as they write, by assisting them to select words and spell more accurately. Most WPR programs allow the user to hear the selected words as they are chosen. In addition, the text can be echoed as text is entered for spell checking and word flow. Some programs also review writing with text colour and highlighting as well as text-to-speech options.

Word prediction and speech feedback are important functions that bolster students' skills when writing. The text can also be 'sent' to programs including *Microsoft® Word, Open Office Org* applications, *MS WordPad*, spreadsheets, databases, *MS PowerPoint, Notepad or Outlook* and when using some Word Prediction products, the text can also be highlighted and read aloud within that application.

Word prediction does not correct grammar, sort out punctuation or provide creative ideas. It supports the user in helping to determine and choose the correct spelling of a word, often with dictionary and/or homophone support.

Word Predication works on two main principles of frequency and recency. Words are predicted on a number of criteria. Firstly, the word needs to be in the dictionary being used. If a word has been used recently, it will appear further up the list. If used frequently it will appear at the top or high in the list. After a time period, the software predicts more and more accurately as it continually monitors the word usage and vocabulary being used by the student.

Word Prediction applications come with a built-in Main Dictionary. The size of the dictionary in total number of words varies. If a word that a student uses frequently isn't included, he or she can add it to a custom 'user dictionary'. A feature commonly added to most WPR programs is the automatic function where new words can be added as they are entered. There are also topic dictionaries that can be downloaded from developer's web sites or created by the education support team.

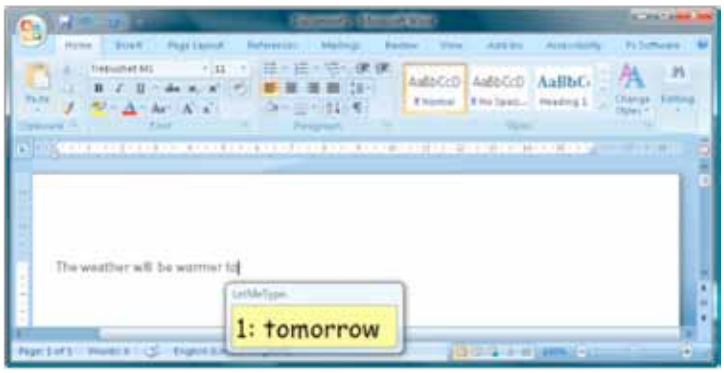
Users can also import lists of words on themes, topics or interest areas. In addition to word prediction, most WPR programs offer 'abbreviation expansion', and sentence completion. This is where a letter combination such as *MCG* can be expanded to *Melbourne Cricket Ground.*

In some WPR programs, students can adjust the pitch and speed of a selected speaking voice. The human sounding SAPI 5 voices that are now available in commercial off-the-shelf programs provide clearly articulated speech. The word being highlighted in the word prediction window (by hovering over it with a mouse, left or right clicking on it or by pressing a designated key) can be voiced so as the student can check that it is the required word. Words can be scanned up or down the list and voiced.

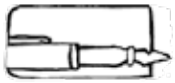
There are numerous options and combinations so careful evaluation and scrutiny of the software is required before it is purchased. Often trialling a program by using a demonstration copy is well worth the effort.

Most programs have user definable 'hot keys' where certain popular or critical functions are assigned to keyboard combinations (e.g. *Alt Shift =*). As long as they don't conflict with the operating system (e.g. *MS Windows*) or the application they are using (e.g. *Open Office Writer*) it avoids locating the mouse and then accessing a menu option. It saves time, is usually faster for most users and caters to students who are blind or vision impaired. It also caters to students who fatigue using a mouse and keyboard combination. A useful and helpful Word Prediction chart is available at http://www.spectronicsinoz.com/article/word-prediction-software-comparison-chart.

LetMeType is a free word prediction program which can support learners with literacy difficulties. Word prediction software predicts words or phrases when two or more characters on the keyboard are pressed. It can also be used to support learning with Modern Foreign Languages (MFL) and as a tool to support those learners who have English as an additional language. In addition, word prediction can help learners who have a mobility difficulty and want to increase their typing speed and accuracy. LetMeType word prediction software can be downloaded from: http://www.clasohm.com/lmt/en/



Let Me Type - Word Prediction



Why might some people find Word Prediction difficult at first?

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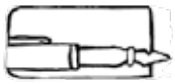

Can you identify the benefits of word recognition software for students with learning disabilities?

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Portable Note Taking Pens and Devices

A digital pen is an input device that captures the handwriting or brush strokes of a user, and digitizes them so that they may be downloaded to a computer and displayed on its monitor. The data can then be interpreted by handwriting software and be used in different applications or just as graphics. Digital pens contain internal electronics, and have features such as

- Touch sensitivity
- Input buttons
- Memory
- Bluetooth transmission capabilities
- Electronic erasers

For an overview of the digital pen – or digital note taker go to ttp://www.pegatech.com/ and watch the brief video clip. The clip highlights the benefits for disability support workers in using a digital pen in the role of note-taker.

The Digital Pen & USB Flash Drive model is a multifunctional peripheral that gives users the freedom to record whatever they write or draw, whenever and wherever they are, without a computer. It allows users to save, store and share the information as they gather, record and create it. It is a very discrete, small and mobile link that connects the writer to the power of a computer and note taking, word processing and other text entry software. Using a USB flash drive containing 1GB of memory, users can store everything they write or annotate including music, data and pictures. Depending on the user's needs, they can also convert handwritten notes to digital text. Unlike most digital pens, IntelliPens do not require special paper - IntelliPens work on any surface, giving users complete flexibility, portability and freedom. With IntelliPens 1GB storage capacity, students are able to write and record thousands of pages.

In the event that a user loses or misplaces some of the actual written notes or pages, it can be retrieved from the IntelliPen's USB flash drive.

Handwriting recognition *Windows Vista and Windows 7* introduces intelligent recognition as a natural supplement to keyboard input. This new recognition technology efficiently and accurately converts a wide variety of handwriting styles into typed text. Handwriting can be used to quickly enter information anywhere that the computer accepts typed input.

Digital Ink in *MS Office 2007* takes advantage of the pen support offered by more recent *Windows OS* to provide a consistent set of inking options that are available to pen users in all of the most frequently used *MS Office* applications.

In *Windows Vista* and *Windows 7* operating system, there is inbuilt support for tablet PCs and Notebook technology with handwriting recognition. Windows Vista is designed to allow users to get better results in less time and has extensive support for pen and touch input.

Microsoft Journal also provides an intuitive set of tools that enables pen users to naturally enter and gather information that can then be easily located using the powerful search function. Journal tools include a choice of pens, markers, and highlighters, a selection lasso, and a flag tool. These inking options are found on the Review Tab within each application and provide the ability to intuitively make notes, diagrams, and highlights. Specific inking tools can be added to the *Quick Access Toolbar* located at the top of each application to keep the most commonly used tools handy at all times. In *MS Word*, pen users also have the ability to insert handwritten notes referred to as Ink Comments. In all applications, pen users have the option of entering text using handwriting recognition in any field or area that accepts keyboard input.

The Pulse Smartpen is a digital voice recorder and physical 'pen' that captures audio while a user writes. As

a user listens he or she can write down notes on the specially designed "smart" paper. It therefore becomes a trigger point for the recording. When a user wishes to listen to that part of the recording, he or she taps the pen on the paper.

The pen requires a special kind of paper to work. Livescribe calls it *Dot Paper*, as there are microscopic dots all over the writing page that the pen's built-in infrared camera recognises.

Since what is written has no bearing on the recording, other than setting a marker for the audio file, a person can doodle, draw graphs or annotate other information provided to them. If users miss a comment or statement, they need only tap on their notes or drawings with the tip of their Pulse Smartpen to hear what was said while they were note taking or writing. They can then elect to transfer their notes to their computer, organise them, and even search for words within the notes. It records audio as well in a classroom, lecture, training session or meeting and links the audio directly to what was written. Once again, reviewing the audio content is as simple as tapping on the notes or drawings with the tip of the Smartpen to hear what was said whilst writing.

Graphics and writing tablets are becoming lighter in weight, easier to connect (i.e. wireless, Bluetooth or USB) and more robust. Some models can be configured to work with a finger as the pointer and/or a stylus. Some models can be found on graphics tablets made by manufacturers such as *Wacom*, while other models are tablet-less, such as those using Anoto technology, which works on paper or other surfaces such as whiteboards. Digital paper, also known as *interactive paper*, is patterned paper used in conjunction with a digital pen to create handwritten digital documents. The printed dot pattern uniquely identifies the position coordinates on the paper. The digital pen uses this pattern to store the handwriting and upload it to a computer. Digital paper should not be confused with electronic paper.

One of the more recent Wacom models is the Bamboo Fun. Bamboo Fun combines the benefits of multi-touch technology with the comfort and precision of its ergonomically designed pen. With multi-touch, students are able to navigate, scroll, and work with simple hand gestures. With the tablet's large touch area, students have more room to navigate as opposed to other touch devices such as computer trackpads and iPod styles devices and mobile phones.

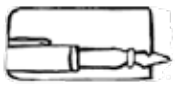
The pressure-sensitive pen is used to draw, sketch, edit photos, and add handwritten elements. Using the built-in software in Windows Vista and 7 operating systems, the device can be used as a digital pen. The size of Bamboo Fun provides sufficient room for students who have difficulty accessing a normal trackpad, making it simple and comfortable to use.

The Bamboo Fun model works with any existing computer: desktop or laptop, MS Windows or Mac OS. The user

attaches it to a standard USB port. It is positioned next to or in front of the person and is accessed comfortably in front of or next to the keyboard. For some users, it can be customised with the users own shortcuts to the four ExpressKeys that are located on the left hand side of the device. It includes valuable additions that make it ideal for creative projects.

The different brands and models of digital pen technology cater to:

- Reluctant writers
- Disengaged students
- Students who are learning to write (cursive or print)
- Students who enjoy writing but who do not want to type the content again
- Students who do not have a notebook or tablet PC and who wish to write instead of type
- People in the workplace who write notes and take minutes
- Students in tutorials and especially lectures where the portability of pen and paper is less intrusive and easier to manage
- Educators who prefer to take notes or record information in hand writing
- Scribes and note takers supporting students in various classes and lectures



Research digital pens and find two other competing technologies.

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Explain the functions of these pens?

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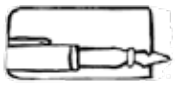

Explain how these technologies could assist a student with learning disability/difficulties?

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Spell Checkers and Thesaurus software

Users rely on spell checkers for a variety of reasons. Typing errors are the obvious mistakes users make whilst entering text due to speed, poor typing skills or missed keystrokes.
Over and above typing errors, users of all ages misspell infrequently or inconsistently. This section outlines the technology and software supports that exist to help users identify and correct misspelling in their work. In brief, spelling utilities and programs:

- Assist people who spell poorly
- Assist people with dyslexia
- Gives additional supports to people who need to check the spelling as they type or after completion of text entry as completed sentences or paragraphs
- Provides greater independence
- Assists in improved independent proof reading

Most spell checkers work on similar principles. The more 'intelligent' programs or utilities track user errors and keep a log. These are more reliable and cater to users who have poor spelling skills. Common errors include:

- Missed letters
- Additional letters
- Double vowels
- Double consonants
- Anagrams
- Reversed order of letters
- Phonetic errors

Spelling programs assist users in identifying errors and alert them to the mistake. In MS Word, an incorrect spelling will have a red underline underneath the word. A user can right-mouse-click on the word and a pop-up menu will list possible interventions. If the person incorrectly typed the word 'Mke' for word 'make', then a list of corrections will promote words such as *"Mike", "Me", Moke"* and *"Moe".*

The user may elect to ignore these words or *Add* this new word to his or her dictionary. The person can nominate to have the word automatically corrected as well. By clicking on the *Spelling* option, a new window will appear. This is where the user can change the dictionary, or change the word once or many times from *'Mke"* to *"Make"* or even cancel this operation.

It is advisable to have the current dictionary as "Australian", (i.e. not the *American* dictionary or *English* for *Canada* option etc.). The Microsoft spelling engine will work across all of the *MS Office* programs (e.g. E*xcel, PowerPoint, Access* etc). When students open other programs that are not in this group or 'family' they may require a global spell check.

Programs such as *textHELP Read & Write V9* or *ClaroRead 2008*, if used consistently and launched before working on an email, web site, art and design program or other non-Office program, maintain a user's spelling history. The one spell check can therefore track usage and report when and how a student misspells. Educators and therapists can use these features as a diagnostic tool as both programs monitor word usage and report the type of spelling errors experienced over a time frame. They can list or print the type of errors so that educators or users can attend to the misspelt words and identify them for future reference.

Some words are used incorrectly, but are spelled correctly. Homophones or 'confusables' are commonly used words that do not appear in a spell checker, as they are not misspelt. The context is the error. There are over 18,700 words in English that can be classified and included as homophones. Therefore, a homophone checker is essential for some students.

Free utilities such as *tinySpell V1.5* can be very useful. It caters to students who need a global spell checker. TinySpell is a small utility that allows users to easily and quickly check the spelling of words in any Windows application. TinySpell can watch typing on the fly and alert the user whenever it detects a misspelled word. It can also check the spelling of text that is copied to the clipboard. TinySpell installs itself in the system tray for easy access. It comes with an American-English dictionary containing more than 110,000 words. While students are typing, tinySpell watches the text that is entered.

When a user copies text to the clipboard, tinySpell immediately checks the spelling. If it finds at least one misspelled word in the text it beeps and turns its icon to yellow. If the icon is white it means that no misspelled words were found in the clipboard text. It is a handy free utility that is discrete and works as text is entered or copied to or from any program.

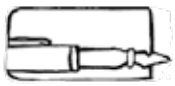
Users can also download and install other dictionaries. A range of languages are also supported for LOTE students. Many programs work very efficiently as embedded programs. *WordTalk* has just been released as version 4.2. It resides in *MS Word* as a toolbar. Not only does it perform a spell check, but it also has text-to-speech facilities. Students can hear the word or words being promoted as potentially correct.

Thesaurus and Dictionary Support

- An electronic thesaurus assist students with definitions and meanings
- It is available immediately as am installed program on the computer or accessed as a web resource
- Words can be researched quickly and independently
- Words can be cut and pasted into the user's document
- Searching for synonyms or antonyms can access difficult words more efficiently

A number of programs exist for use of electronic thesaurus and dictionaries. Some are installed applications whilst others are web-based resources. A web site such as www.thesaurus.com also links to http://dictionary.reference.com/. Web browsers typically provide a space to place bookmarks on a user's toolbar, making it a convenient bookshelf for favourite reference tools. Users can drag the links on this site onto the Firefox toolbar for instant access to www.Dictionary.com, www.thesaurus.com, and www.reference.com . (http://thesaurus.reference.com/tools/bookmarklets.html)

Other thesaurus programs that require installation include *Wordweb V5, The Thinking Man's Thesaurus* and *The Sage*.



Why doesn't the spell checker always work on your computer with all of your software?

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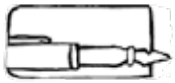
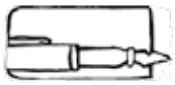


Does a spell check programs always provide correct spelling options? Why?

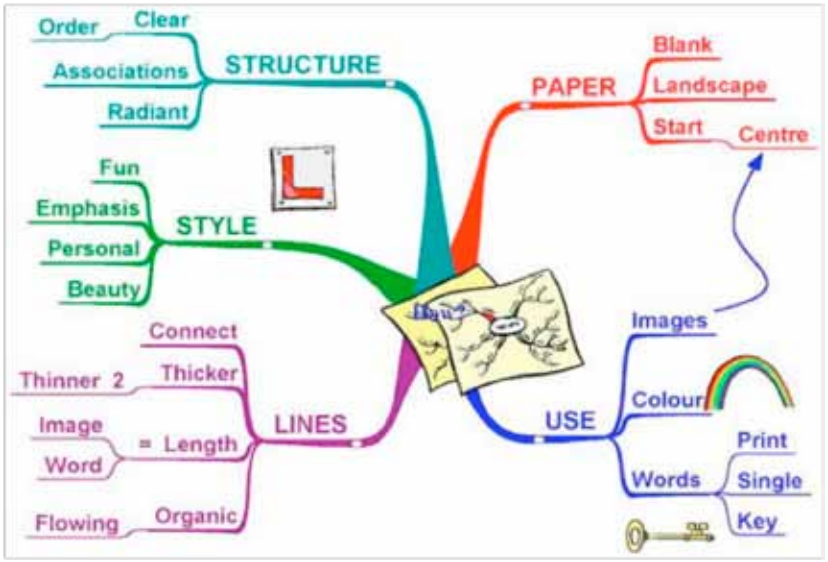


Explain how a spell checker with text-to-speech might be more useful to students with learning disabilities/difficulties?

Mind Mapping Software

Mind mapping (or creating a brainstorming diagram) involves writing down a central idea and generating new and related ideas which radiate out from the centre. By focusing on key ideas written down in the student's own words, and then looking for branches out and connections between the ideas, he or she is mapping knowledge in a manner that will assist in planning for study. Mind mapping software is used to create diagrams of relationships between ideas or other pieces of information. It has been suggested that the mind mapping technique can improve learning/ study efficiency up to 15% over conventional note taking.

A mind map is a diagram used to represent words, ideas, tasks, or other items linked to and arranged radially around a central key word or idea. Mind maps are used to generate, visualize, structure, and classify ideas, and as an aid in study, organization, problem solving, decision making, and writing. The elements of a given mind map are arranged intuitively according to the importance of the concepts, and are classified into groupings, branches, or areas, with the goal of representing semantic or other connections between portions of information. Mind maps may also aid recall of existing memories.

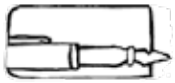


By presenting ideas in a radial, graphical, non-linear manner, mind maps encourage a brainstorming approach to planning and organizational tasks. This orientation towards brainstorming encourages users to enumerate and connect concepts. The mind mapping, flow-charting and brainstorming programs that are available for free or at a cost provide a more visual and graphical interface. By simply clicking on the screen display, students can type text into a designated box or symbol. Dragging these ideas about, linking and unlinking them, deleting, moving, duplicating and rearranging them is more akin to working on a whiteboard with a Texta and eraser. Students ideas, thoughts, opinions, suggestions and content is readily editable, albeit electronically. With the use of external drawing tablets (e.g. wireless *Wacom Cintiq, Bamboo* or *Graphire* models) and *Interactive Whiteboards*, these programs become even more powerful and inviting to users of all ages.

Icons and graphics can be used in some software programs, with linking arrows and tools to clearly show connections and relationships. Use of colour, text-to-speech, hyper linking, spell checkers and word guides also assist in the creation of maps and webs. Mindmapping programs often differ in how they present the information – for students with specific learning disabilities the less complex the program the better.

Inspiration V8 works within the level of complexity and skills required for older students, along with an expanded set of tools. Free programs such as *Edraw Min Map, Vym* and *XMind* offer students a chance to experiment with this genre of software, with portable apps such as *XMind* and *Freemind* (the latter two available on the *AccessApps* suite of programs that operate and launch from a USB drive – www.eduapps.org).

Mindmapping programs such as *Spark Space* provide support for users who are dyslexic. This program has been specifically designed for this audience. A great deal of research was undertaken to deliver *Spark Space* and it has unique features that cater to learners who struggle with traditional "flat text" formats.



Source a mindmap program, develop a small mindmap outlining the benefits of mindmapping software for students with learning disabilities and insert the map here.

Portable TTS Solutions

A portable program is a piece of software that you can carry around with you on a portable device and use on any other computer. It can be your email program, your browser, system recovery tools or even an operating system. The coolest part about it, is that all of your data and settings are always stored on a thumb drive so when you unplug the device, none of your personal data is left behind.

There are many portable assistive software programs that are designed to benefit students with learning disabilities or learning difficulties. The range of freeware includes:

- Office Tools
- Planning & Organisation tools
- Multimedia Tools
- Reading & Writing Support
- Visual Support
- Keyboard/Mouse Alternatives
- Browsers
- Presentation Tools
- Authoring Tools
- VLEs
- Utilities
- Backup/Synchronisation
- Simulation & Modelling
- Games

One of the most popular and widely used suite of applications are designed under the banner of EduApps. EduApps comprises more than 100 portable freeware or open source applications that have a customisable launch interface. The software applications can be installed on any portable drive, i.e. USB thumb drive, PDA or an iPod. You can use them at work, school, or any other place where you can plug in your device. The suite of applications are divided into AccessApps and LearnApps for students and TeachApps for teachers. Users of the EduApps can download the software applications that they feel will benefit them and develop their own MyApps suite of software. The applications include mindmapping, text to speech, OCR software, predictive text, open office, audio editors and recorders and much more.

EduApps can be downloaded from: www.eduapps.org

MyStudyBar is a very popular suite of assistive software applications designed to support learners with literacy-related difficulties such as dyslexia. The tool consists of a set of portable open source and freeware applications, assembled into one convenient package. MyStudyBar puts a whole range of individual and essential tools at your fingertips. Together, these have been designed to support the complete study cycle from research, planning and structuring to getting across a written or spoken message. MyStudyBar has 6 sections; each has a drop down menu offering personal choice, flexibility and independent learning, particularly for those learners who require additional strategies to support their learning. With over 15 apps to choose from, MyStudyBar is the perfect study aid.

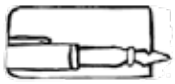
Examples include: Xmind for planning and organization; T-Bar for customising font and colour backgrounds; Lingoes for when you need a talking dictionary; LetMeType for help with text input, and Balabolka for converting text to audio. There is also a speech-to-text app which allows you to talk to your computer.

You can use MyStudyBar straight from a USB stick (if, for example, you are using a machine that is not your own) or you can install it directly to the desktop. (Technical staff in colleges or universities also have the choice of installing it on the network for everyone to use). However you choose to use it, MyStudyBar pops up on your screen like this:

Go to http://www.rsc-ne-scotland.org.uk/MyStudyBar/MyStudyBarV2/MyStudyBarV2.html and watch the brief demonstration of MyStudyBar. There are also a series of brief video clips highlighting the capacity of all applications on MyStudyBar that can be viewed individually from this site.

The value of a portable suite of applications designed specifically with literacy difficulties in mind cannot be underestimated. This simple suite of applications available through free download can empower students that have historically been excluded through traditional paper based methods of teaching and learning. Applications such as this have been designed to foster independence for students with learning disabilities/difficulties.

MyStudyBar can be downloaded from http://www.rsc-ne-scotland.ac.uk/eduapps/mystudybar.php



Download one free assistive software application that would support a student with learning difficulties or learning disability and describe its functions here.

Web 2.0 Tools and Online Study Resources

The term "Web 2.0" is commonly associated with web applications that facilitate interactive information sharing, interoperability, user-centred design and collaboration on the World Wide Web. Examples of Web 2.0 include web-based communities include;

- Hosted services
- Web applications
- Social networking sites
- Video sharing sites
- Wikis
- Nings
- Blogs
- Mashups
- Folksonomies

A Web 2.0 site allows its users to interact with each other as contributors to the website's content, in contrast to non-interactive websites where users are limited to the passive viewing of information that is provided to them. Although the term suggests a new version of the World Wide Web, it does not refer to an update to any technical specifications, but rather to cumulative changes in the ways software developers and end-users use the Web.

Web 2.0 websites allow users to do more than just retrieve information. They can build on the interactive facilities of "Web 1.0" to provide "Network as platform" computing, allowing users to run software applications entirely through a browser. Users can own the data on a Web 2.0 site and exercise control over that data. These sites may have an "Architecture of Participation" that encourages users to add value to the application as they use it.

The concept of Web-as-participation-platform captures many of these characteristics. Bart Decrem, a founder and former CEO of *Flock*, calls Web 2.0 the "participatory Web" and regards the Web-as-information-source as Web 1.0.

The common characteristics of Web 2.0 are: rich user experience, user participation, dynamic content, metadata, web standards and scalability. Further characteristics, such as openness, freedom and collective intelligence by way of user participation, can also be viewed as essential attributes of Web 2.0.

Hundreds of web sites exist that can assist struggling students and help them with all manner of educational pursuits as well as offer social networking opportunities, collaboration and information handling and sharing.

Student support and note taking sites include:

http://universitynotes.net/	University Notes is an online network dedicated to making the college life easier and more enjoyable. By allowing students to communicate and share info with each other, they can keep in touch and collaborate more quickly and easily. They can share notes and course materials, keep in touch with classmates.
http://mynoteit.com/	Take, edit and share notes online as well as maintain a calendar, to-do lists and manage college life.
http://edublogs.org/	Manage Student and Teacher Blogs
www.wikispaces.org	Wiki hosting site – free for educators P-12

Assessment Task - Case Study

Case study to be included by the Trainer.

Assessment

Explain in 500 words the process you would take to determine the most suitable assistive technologies and why you believe these technologies might assist to remove barriers in the teaching and learning environment for this student. Within your response, indicate the strategies used to introduce relevant technologies including the concerns the student may have around using technology.

Inclusive Technology Online Resources

AT Implementation Plan Form	http://natri.uky.edu/atPlannermenu.html
Assistive Technology Presentations	http://download-book.net/assistive-ppt.html
SETT Framework Resources	www.fctd.info/webboard/displayResources.php?
Association of Assistive Technology Act Programs	www.ataporg.org
National Public Website on Assistive Technology	www.assistivetech.net
Writing with Word Prediction	http://www2.edc.org/NCIP/library/wp/profile.htm
The Assistive Technology Online Project	http://atto.buffalo.edu/
Assistive Technology Links	http://www.infogrip.com/links.asp
NIMAS – Flexible Alternatives to Print	http://nimas.cast.org/about/resources/assistive_technology
NATTAP – Technical Assistance Partnership	http://resnaprojects.org/nattap/at/resources.html
ADCET – Creating Accessible Teaching	http://www.adcet.edu.au/Cats/Technology_and_Facilities/Assistive_Technology.chpx
Australian Rehabilitation & Assistive Technology Association	http://www.arata.org.au/resources.php
LD Network	www.ldnetwork.net.au

Additional Resources and Web links on choosing Assistive Technologies

Bowser, G., & Reed, P. (2001). Hey Can I Try That? A Student Handbook for Choosing and Using Assistive Technology: Available from www.wati.org/products/pdf/heycanitrythat.pdf

Personal Choices: Finding Low and Mid Tech Tools That Work For You – http://www.onionmountaintech.com/files/PersonalChoices.pdf

Zabala, J. S. (2005). Using the SETT Framework to Level the Learning Field for Students with Disabilities. Retrieved 26/02/08, from http://www.ode.state.or.us/initiatives/elearning/nasdse/settintrogeneric2005.pdf

Assistive Technology Training Online Project (ATTO): Assessing Student Need – http://atto.buffalo.edu/registered/ATBasics/Foundation/Assessment/index.php

SETT Framework – http://sweb.uky.edu/~jszaba0/JoySETT.html

NZ Ministry of Education. Assistive Technology Guidelines: Supporting Students with Special Education Needs . A guide to support schools and specialists to provide quality assistive technology services. http://www.minedu.govt.nz/web/downloadable/dl7576_v1/7576-assistive-technology-guidelines-apr-08.pdf

WATI – http://www.wati.org/?pageLoad=content/supports/free/index.php

AT Cycle, MATN Online – http://olms.cte.jhu.edu/olms/output/page.php?id=9514

TexhMatrix – www.technatrix.org

IT for AT – http://www.paec.org/fdlrstech/itforat/start_here.html

Onion Mountain Technology – http://www.onionmountaintech.com/assistive.php

References

Alliance for Technology Access. 2000. *Computers and Web Resources for Persons with Disabilities: A Guide to Exploring Today's Assistive Technology*, 3rd edition. Alameda, CA: Hunter House.Blackhurst,

A. Edward, and Lahm, Elizabeth A. 2000. "Technology and Exceptional Foundations." *In Technology and Exceptional Individuals*, ed. Jimmy D. Lindsey. Austin, TX: Pro-Ed.

Chambers, Antoinette C. 1997. *Has Technology Been Considered?* A Guide for IEP Teams. Reston, VA: Council of Administrators of Special Education and the Technology and Media Division of the Council for Exceptional Children.

Cook, Albert M., and Hussey, Susan M. 1995. *Assistive Technologies: Principles and Practice. St. Louis*, MO: Mosby.

Flippo, Karen F.; Inge, Katherine J.; and Barcus, J. Michael, eds. 1995. *Assistive Technology: A Resource for School, Work, and Community*. Baltimore: Brookes.

Galvin, Jan C., and Scherer, Marcia J. 1996. Evaluating, Selecting and Using Appropriate Assistive Technology. Gaithersburg, MD: Aspen.

Golden, Diane. 1998. *Assistive Technology in Special Education: Policy and Practice*. Reston, VA: Council of Administrators of Special Education and the Technology and Media Division of the Council for Exceptional Children.

Individuals with Disabilities Education Act of 1997. U.S. Public Law 105-17. U.S. Code. Vol. 20, secs. 1400 et seq.

Anderson-Inman, L. (1999). Computer-based solutions for secondary students with learning disabilities: Emerging issues. Reading and Writing Quarterly, 15, 3, 239-249.

Aspin, M. (1997), On-line learning: Offering Inclusive Opportunities, NET*Working '97 Conference, ANTA National Flexible Delivery Physical and Online Conference, Adelaide Nov 19–21, 1997.

Barlow, A.R. & Lacey, P. (1998), Issues in introducing technology into equity groups, in 3rd National Equity &

Access Conference, Yeppoon, Queensland Sept. 1998

Bayha, B. (1998). The Internet: An inclusive magnet for teaching all students. Berkeley, CA: World Institute on Disability.

Blackwood, L. (1999). Disability. Appendix in Meredyth, D., Russell, N., Blackwood, L., Thomas, J., & Wise, P., Real time: computers, change and schooling. Canberra: DETYA.

Delzell, N. & Hamill, K. (1996). Global schoolhouse: a special way to meet special needs. Multimedia Schools, January/February, 71-74.

Greenhill, A., Fletcher, G. & vonHellens, L. (1999). Cultural differences and information technology skills. A paper in Meredyth, D., Russell, N., Blackwood, L., Thomas, J., & Wise, P. Real time: computers, change and schooling. Canberra: DETYA.

Haskin, D. (October, 1997). Talking to your PC. *PC Magazine*.

Himowitz, M. (August, 1997). Voice recognition grows up. *Fortune Magazine*.

Kambeyanda, D., Singer, L., & Cronk, S. (1997). Potential problems associated with use of speech recognition products. RESNA Assistive Technology 9 (2), 95-101.

Heaviside, S., Rowand, C. Hurst, D. & McArthur, E. (2000). What are the barriers to the use of advanced telecommunications for students with disabilities in public schools? Education Statistics Quarterly: Elementary and Secondary Education.

Kaye, H. Stephen (2000). Computer and Internet use among people with disabilities. Disability Statistics Report 13. San Francisco: National Institute on Disability Statistics.

Lewis, R. (1997). Changes in technology use in California's special education programs. Remedial and Special Education, 18, 4, 233-242.

Loge, J. (August/September, 1999). Effective speech recognition in school. *Closing the Gap*, 12-13, 27.

Meredyth, D., Russell, N., Blackwood, L., Thomas, J., & Wise, P. (1999). Real time: computers, change and schooling. Canberra: DETYA.

National Center for Improving Practice. (February, 1996). Voice input: An option worth exploring. *CEC/TAM Connector* 9 (7).

Newman, D. (2001). The dragon naturally speaking guide (3rd ed.). Waveside Publishing: Berkley, CA.

Newman, D. (2000). Talk to your computer. Waveside Publishing: Berkley, CA.

Penney & Associates Ltd., (1996), Internet Access for People with Disabilities: Final Report

Quin, G., & Degener, T. (2002) *The current use and future potential of United Nations human rights instruments in the context of disability.* United Nations: Geneva

Soto, G., Muller, E., Hunt, P., & Goetz, L., (2001) Critical issues in the inclusion of students who use augmentative & alternative communication: an educational team perspective, in *ACC Augmentative & Alternative Communication*, Vol 17, June 2001.

Young, J. (1998), For students with disabilities, the Web can be like a classroom without a ramp, The Chronicle of Higher Education, 13 March, 1998.

Erickson, K. & Koppenhaver, D. (1998); Using the 'Write Talk-nology" with Patrick, Teaching Exceptional Children, 31(1), 58–64.

Speech Technology: The magazine of applied speech technology. CI Publishing, 43 Danbury Road, Wilton, CT, 06897; 203-834-1430; speechmag@aol.com http://www.SpeechTechMag.com

Sturm, J. (1998), 'Educational inclusion of ACC students', in D. Beukelman & P. Mirenda (Eds). *Augmentative and alternative communication: Management of severe communication disorders in children and adults*. Balimore: Paul H. Brookes.

Tam, C., & Kotler, A. (December 1995/January 1996). Assessment criteria for using voice recognition systems as writing aids. Closing The Gap, 14-17.

Weinstein, P. (October, 1998). Technology snapshot: Speech recognition. *Technology & Learning.*

Inclusive Technology Terms

AAC (Augmentative and Alternative Communication)
AAC includes communication boards, dedicated devices and software that enable a non-verbal person to communicate.
A communication board is a printed board that allows communication - by pointing to words, letters, symbols or pictures. Technology, however, takes this type of communication a step further by providing speech output of words and phrases.
A dedicated communication device is hardware, usually portable, that provides speech output of words and phrases and input by various methods.
Software communication applications are used in the same way as dedicated devices, except that they are installed on a computer, often on a laptop for portability.

Alternative keyboard
A hardware device that replaces or works alongside a standard keyboard.
It can be larger or smaller than a standard keyboard, and can usually be positioned or configured to meet the needs of individual students.
Some alternative keyboards also include an alternative method for mouse control. (Examples: mini keyboards, expanded keyboards.)

Braille input
Devices that allow input to the computer via a braille-style keypad or specific keys on a standard keyboard that function in braille patterns.

Braille output
Devices that provide output from a computer either as embossed braille on a material such as paper, plastic or metal - or as paperless, refreshable braille display.

Environmental Control Unit
A device or software/hardware combination that allows a person with a disability to perform tasks that alter his or her environment, such as turning lights on and off, answering a telephone, or changing television channels.

Expanded keyboard
An alternative keyboard that offers a larger surface area and bigger key areas for people with difficulty using their hands (spasticity, lack of fine motor control, etc.).
They are usually flat "membrane" keyboards that can be reconfigured for various key layouts and enhancements, such as turning off key repeat.

Head Pointing
A method that allows people who cannot use their hands to perform computer functions with head movement. The device includes a headset and control unit that measure and translate head movements into cursor movements on the screen.

Input Device
Any device that allows information or data to be entered into a computer.
The standard keyboard and mouse are both examples of input devices.
Some people, however, cannot use these standard devices.
They may experience spasticity or a lack of coordination that prevents them from hitting the correct keys or grasping a mouse.
They may have use of only one hand and find typing difficult or slow.
They may have no use of their hands and have no access to the usual input methods. Keyboard and mouse alternatives provide a way for people with various types of physical limitations to become more productive and efficient computer students.

Joystick
An input device that consists of a rod that the user pushes in the direction of intended movement to control a cursor on screen.

Keyboard Emulator
A hardware device that connects to the computer and allows input from a source other than the standard keyboard.

Keyboard Enhancement
Adaptations made to a standard keyboard for use by people with hand disabilities.
For example, software can change the way the keyboard responds - such as slowing the acceptance rate and repeat rate of keys or latching modifier keys with the next key pressed for one-handed typing.
Physical keyguards can also be placed over the keyboard to prevent unwanted keys from being hit.

Keyguard
A device that covers a standard or alternative keyboard to provide direction for a finger or prod.
It usually consists of a hard surface, such as plastic, with holes that correspond to the keys.
It allows users to slide their hands across the keyboard without accidentally striking keys.

Mini keyboard
An alternative keyboard designed to provide access for people with limited range of motion. Some are simply very small keyboards that make use of a stylus for typing, while others provide a "frequency" layout of keys that places the most frequently used keys around the centre.

Mouse Alternative
An input device that provides another way of moving the pointer on screen for people who have difficulty using a standard mouse. (Examples: trackballs, joysticks, touch screens.)

OCR
Optical Character Recognition
A process used by scanning devices to translate scanned images into ASCII text format, which can then be enlarged or read aloud by a speech synthesizer.

Onscreen Keyboard
Software that displays a replica of the keyboard on the screen (e.g. Click 'n' Type)
Any pointing device can be used to select keys.
Onscreen keyboards can help people with disabilities or those who have difficulty tracking between the standard keyboard and the screen.

Output Device
A device that enables the user to receive information from the computer.
The standard method for doing this is reading the computer screen - although some programs also include sound or animation.
Some people cannot see what is on the screen due to a vision impairment or cannot read text on screen because they have a print disability.
People with hearing impairments cannot hear the computer when it beeps or otherwise provides sound output.
Adaptations to provide access to computer output can include display magnification, speech output, visual "beeps" for the hearing impaired, or other devices that provide access to printed material, such as closed circuit television or electronic readers.

Scanning
Software that automatically steps through response choices, such as rows and columns of letters or words that a user selects by clicking a switch.

Screen Magnification
A program that enlarges the images on a computer screen.
Some include hardware, such as a video card or mouse, but most of them are software only.
There are usually options for magnification size, screen inversion, partial screen magnification, and scrolling of text for easier reading.

Screen Reader
Software that is used with a speech synthesizer to provide speech output of all items on screen. Created for use by people who are blind.
A screen reader reads all information on screen, alerting the user to changes in format, the appearance of dialog boxes, windows, etc., as well as reading back text that has been entered in a document.

Speech Output
Sounds similar to human speech created by a speech synthesizer.
Various software programs make use of speech synthesis to provide screen reading or text-to-speech capabilities.

TDD
Telecommunications Device for the Deaf
A device that enables the user to send typed messages over telephone lines.

Text-to-Speech
Software that enables the user to have text read aloud by the computer.
TTS programs differ from full screen readers by providing speech access only to text that has been written within a document and, with some programs, menu items, dialogue box content and icons.

Touch Screen
A pressure-sensitive, transparent screen that fits over the computer screen and allows the user to control the movement of the pointer by touching the screen.

Trackball
A mouse alternative in which the user rotates a ball to move the pointer on screen and presses switches for mouse clicks and dragging.

Voice input
Software and hardware that enables a user to dictate words or give commands to the computer by speaking into a microphone.

Voice input provides an alternative input method for people with little or no hand use, as well as people with dyslexia who have extreme spelling difficulties.

Word Prediction
Software that offers a list of words to choose from when a letter is typed.
Word prediction programs were originally designed to speed typing for people with physical disabilities by reducing the number of keystrokes required to type whole words and sentences; however, they have also helped some people with learning disabilities who have difficulty finding the right word or spelling entire words.

Notes

Participant Evaluation

Circle the number on the scale below (with 5 being the greatest) that corresponds the most closely to your experience and learning with this training.

I have a greater understanding of specific learning disabilities than before the training.

5 4 3 2 1

I believe this training will improve my workplace practice when supporting students with specific learning disabilities and other learning difficulties.

5 4 3 2 1

I believe that this is important training for Disability Support Workers in an Adult Education environment.

5 4 3 2 1

I would like to do further training around other specific disability areas and the barriers that can occur in the teaching and learning context.

5 4 3 2 1

Please give a few words about:

The most useful components of the program;

_____

_____

_____

What I would like to know more about;

_____

_____

_____

Any other Comments:

_____

_____

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Notes

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Notes

Notes